

THE FAUNA OF BRITISH INDIA CEYLON AND BURMA,

INCLUDING THE WHOLE OF

THE INDO-CHINESE SUB-REGION.

*PUBLISHED UNDER THE PATRONAGE OF THE SECRETARY OF
STATE FOR INDIA.*

EDITED BY LIEUT. COL. R. B. S. SEWELL, C.I.E., SC.D., F.R.S., I.M.S. (*ret.*).

REPTILIA and AMPHIBIA.

VOL. III.—SERPENTES.

BY

MALCOLM A. SMITH.

With 166 figures in the text.

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INTRODUCTORY NOTE

The volume III on Serpents in the Reptilia and Amphibia group by Dr. Malcolm A. Smith in the *Fauna of British India* series – renamed as the *Fauna of India* series since the Independence of India in 1947 – was published in the midst of Second World War in London. in December 1943. Apart from a few hundred copies which were issued or distributed at the time, the stock of volumes printed off by Messrs. Taylor and Francis of London were destroyed by fire during the War. In order to meet the widespread demand for the volume, the Government of India decided to issue the present photo-litho reproduction of the volume. However, as the map originally issued with the volume has become out-of-date, it has been replaced by a revised one prepared by the Directorate of Map Publication, Survey of India, Dehra Dun.

CALCUTTA,
the 17th August, 1957.

M. L. ROONWAL,
Director,
Zoological Survey of India.

CONTENTS

	Page
AUTHOR'S PREFACE	v
SYSTEMATIC INDEX	vii
INTRODUCTION :	
Structure	1
Habits	21
Zoo-geography	22
Evolution and Classification.	25
Preservation and Examination of Specimens	29
Descriptive Methods, etc.	31
Bibliography to Introduction	35
SERPENTES	39
MAP OF THE INDIAN AND INDO-CHINESE HILL DISTRICTS.	524
ADDENDUM	526
NOTE ON THE HARDWICKE COLLECTION	527
NOTE ON RUSSELL'S INDIAN SERPENTS	531
BIBLIOGRAPHY	533
ALPHABETICAL INDEX	568
FOLDING MAP OF INDIA AND CEYLON.	

AUTHOR'S PREFACE.

THIS volume was completed five years ago, but the difficulties of publication due to the war have delayed its appearance until now. Fortunately, very little has been added to our knowledge of Indian snakes in the intervening years, and what has been written that is of value has been incorporated in the book during its progress through the printer's hands.

The general plan and scope of the volume are the same as before, and an account of the regions dealt with and the geographical divisions, will be found in the Introduction to Volume I.

Some 400 species of snakes are now known to inhabit the area covered by this work; 389 species and 17 subspecies are here described (see also page 282). Mr. Boulenger's volume, published in 1890, contained 264 species; he did not, however, include the whole of the Indo-Chinese sub-region.

Most of the work in connection with this volume has been done in the British Museum (Natural History), where the collection of Indian material is very large. In addition I have examined the entire collections belonging to the Indian Museum, Calcutta, and the Bombay Natural History Society, and I must thank the authorities of those Institutions for sending their material to me in London. Both these collections have already been critically dealt with by Colonel Frank Wall, and his labours in this respect have greatly eased my task. Indian herpetologists owe Colonel Wall a great debt of gratitude for his work on snakes. During his 30 years' service in the country he infected others with his enthusiasm and love of the subject, and it is due to him more than any other man that our knowledge of Indian snakes today is so complete. His collection of skulls and his extensive note-books have been presented by him to the British Museum.

The very large collection of snakes made by Dr R. Bourret in French Indo China is now in Paris, and through the kindness of Monsieur F. Angel I have been able to examine it. Unfortunately when compiling his volume on the snakes of that region (page 539 1936) Dr Bourret made no attempt to compare his specimens with typical material, in consequence I find myself unable to agree with many of his conclusions.

My thanks are due also to Dr L. D. Brongersma (Museum of Natural History, Leiden) Miss Doris Cochran (United States National Museum) Dr P. E. P. Deraniyagala (Curator of the Colombo Museum) and Mr Arthur Loveridge (Museum of Comparative Zoology Harvard) for the loan of material, and to Mr H. W. Parker of the British Museum (Natural History) for his valuable help and criticism on many occasions.

Most of the illustrations in this book are new and have been drawn under my direction by Miss E. C. Humphreys.

Finally, I thank Col. Seymour Sewell, my Editor for his supervision of the whole volume.

MALCOLM SMITH

October 1943

SYSTEMATIC INDEX

	Page		Page
Order SQUAMATA.....	39	Gen. 6. <i>Plectrurus Dumeril</i> ..	71
Suborder SERPENTES.....	39	29. <i>perroteti Dum. & Bib.</i> ..	71
Fam. 1. Typhlopidae	41	30. <i>guentheri Beddome</i>	72
Gen. 1. <i>Typhlops Oppel</i>	43	31. <i>aureus Beddome</i>	72
1. <i>porrectus Stoliczka</i>	46	32. <i>canaricus Beddome</i>	72
2. <i>floweri Boulenger</i>	46	Gen. 7. <i>Uropeltis Cuvier</i> ...	73
3. <i>braminus Daudin</i>	46	33. <i>elliotti Gray</i>	75
4. <i>psammeces Günther</i> ...	48	34. <i>nitidus Beddome</i>	76
5. <i>albiceps Boulenger</i>	48	35. <i>ocellatus Beddome</i>	76
6. <i>thurstoni Boettger</i>	49	36. <i>dindigalensis Beddome</i> ..	77
7. <i>jerdoni Boulenger</i>	50	37. <i>beddomei Günther</i>	78
8. <i>leucomelas Boulenger</i> ..	50	38. <i>macrorhynchus Bed-</i>	
9. <i>tenuicollis Peters</i>	50	<i>dome</i>	78
10. <i>diardi Schlegel</i>	51	39. <i>wood-masoni Theobald</i> ..	79
11. <i>oatesi Boulenger</i>	53	40. <i>macrolepis Peters</i>	79
12. <i>bothriorhynchus Günther</i>	53	41. <i>ceylanicus Cuvier</i>	80
13. <i>tindalli Smith</i>	53	42. <i>arcticeps Günther</i>	81
14. <i>beddomei Boulenger</i> ...	54	43. <i>rubromaculatus Bed-</i>	
15. <i>oligolepis Wall.</i>	55	<i>dome</i>	81
16. <i>mirus Jan</i>	55	44. <i>rubrolineatus Günther</i> ..	82
17. <i>ceylonicus Smith</i>	55	45. <i>phipsoni Mason</i>	82
18. <i>andamanensis Stoliczka</i>	56	46. <i>myhendræ Beddome</i> ...	83
19. <i>acutus Dum. & Bib.</i>	56	47. <i>broughami Beddome</i> ..	83
Fam. 2. Leptotyphlopidae	59	48. <i>maculatus Beddome</i> ...	83
Gen. 2. <i>Leptotyphlops</i>		49. <i>petersi Beddome</i>	84
<i>Fitzinger</i>	60	50. <i>liura Günther</i>	84
20. <i>macrorhynchus Jan</i> ...	60	51. <i>pulneyensis Beddome</i> ..	85
21. <i>blanfordi Boulenger</i> ...	61	52. <i>grandis Beddome</i>	85
Fam. 3. Uropeltidae	61	53. <i>melanogaster Gray</i>	86
Gen. 3. <i>Melanophidium</i>		54. <i>phillipsi Nicholls</i>	87
<i>Günther</i>	65	Gen. 8. <i>Rhinophis Hemprich</i>	87
22. <i>punctatum Beddome</i> ..	66	55. <i>blythi Kelaart</i>	88
23. <i>bilineatum Beddome</i> ..	66	56. <i>drummondhayi Wall</i> ..	89
24. <i>wynaudense Beddome</i> ..	67	57. <i>sanguineus Beddome</i> ..	89
Gen. 4. <i>Platyplectrurus</i>		58. <i>homolepis Hemprich</i> ..	90
<i>Günther</i>	67	59. <i>forqusonianus Boulenger</i>	90
25. <i>trilineatus Beddome</i> ...	68	60. <i>philippinus Cuvier</i>	91
26. <i>madurensis Beddome</i> ..	69	61. <i>travancoricus Boulenger</i>	91
Gen. 5. <i>Teretrurus Beddome</i> ..	69	62. <i>punctatus Müller</i>	92
27. <i>sanguineus Beddome</i> ..	69	63. <i>oxyrhynchus Schneider</i> ..	92
28. <i>rhodogaster Wall</i>	70	Gen. 9. <i>Pseudotyphlops</i>	
		<i>Schlegel</i>	93
		64. <i>philippinus Cuvier</i>	93

	Page		Page
Fam 4 Aniliidæ	94	85 <i>trinita</i> Gray	144
Gen 10 <i>Cylindrophis</i> Harter	91	86 <i>oxycephala</i> Bore	144
85 <i>rufus</i> Laurent	90	87 <i>calata</i> Schlegel	144
86 <i>maculatus</i> Lin	94	88 <i>flavolineata</i> & Mapel	144
Fam 5 Xenopeltidæ	99	89 <i>helena</i> Janssens	149
Gen 11 <i>Xenopeltis</i> Steud	100	90 <i>tenuis</i> Cope	150
87 <i>unicolor</i> & <i>R. unicolor</i>	111	91 <i>indivisa</i> Günther	150
Fam 6 Boidæ	100	92 <i>canonius</i> Boulenger	150
Gen 12 <i>Python</i> Daudin	103	93 <i>smallerfordi</i> Boulenger	153
88 <i>nobilis</i> & <i>Leis</i>	106	94 <i>calinata</i> Günther	153
89 <i>reticulatus</i> Schneider	109	95 <i>porphyreus</i> Cuvier	154
Gen 13 <i>Fryx</i> Daudin	111	96 <i>montani</i> Blatz	154
70 <i>conspicua</i> & <i>hans</i>	112	97 <i>maria</i> & <i>ira</i> Cuvier	157
71 <i>john</i> Russell	113	Gen 22 <i>Ptyas</i> Fitzinger	158
Fam 7 Colubridæ	114	98 <i>marinus</i> Leis	159
Subfam DIPSOSAURINÆ	115	99 <i>korra</i> & Mapel	160
Gen 14 <i>Farcus</i> Hoyer	116	Gen 23 <i>Zaocys</i> Cope	163
72 <i>margaritophorus</i> Jan	117	100 <i>carinatus</i> Günther	164
73 <i>maculatus</i> Theobald	118	101 <i>rugomarginatus</i> Blyth	165
74 <i>monticola</i> Cuvier	118	Gen 24 <i>Coluber</i> Lin	166
75 <i>hampton</i> Boulenger	120	102 <i>ventrimaculatus</i> Gray	166
76 <i>carinatus</i> Bore	121	103 <i>de Montevideo</i>	166
Gen 15 <i>Haplophys</i> & <i>Dum</i>	121	104 <i>chalcidophis</i> Jan	166
77 <i>boa</i> Bore	122	105 <i>karelini</i> Steud	169
Subfam XENODERMATINÆ	123	106 <i>maculatus</i> Shaw	170
Gen 16 <i>Xenodermus</i> Rein	123	107 <i>gracilis</i> Günther	171
78 <i>ja</i> & <i>ancus</i> Penhardi	124	108 <i>lawyeri</i> Blatz	172
Gen 17 <i>Stolechilus</i> Jerdon	125	109 <i>diadematus</i> Schlegel	173
79 <i>khasiensis</i> Jerdon	126	110 <i>arconius</i> Boulenger	173
Gen 18 <i>Achalimus</i> Peters	128	Gen 25 <i>Xenolepis</i> Günther	176
80 <i>rufescens</i> Boulenger	126	111 <i>hexagonatus</i> Cuvier	176
Gen 19 <i>Fimbria</i> Smith	129	Gen 26 <i>Ophiodrys</i> Fitzinger	177
81 <i>kloss</i> Smith	129	112 <i>major</i> Günther	178
Subfam ACROCHORDINÆ	131	113 <i>multinotatus</i> Roux	179
Gen 20 <i>Acrochordus</i> Horn	131	114 <i>hamptoni</i> Boulenger	180
82 <i>javanicus</i> Hornstedt	130	115 <i>dorrie</i> Boulenger	181
83 <i>granulatus</i> Schneider	132	Gen 27 <i>Lapeltis</i> Fitzinger	181
Subfam COLUBRINÆ	135	116 <i>trinitatus</i> Günther	182
Gen 21 <i>Elaphis</i> Fitzinger	129	117 <i>stolechilus</i> Schlegel	184
84 <i>prasma</i> Blyth	143	118 <i>calamaria</i> Günther	184
		119 <i>nobiliaris</i> Stoliczka	185
		120 <i>rappi</i> Günther	186
		121 <i>scriptus</i> Theobald	186
		Gen 28 <i>Contia</i> Blatz & Girard	187
		122 <i>perissa</i> Anderson	187
		123 <i>memaboni</i> Wall	189
		Gen 29 <i>Lytrochynchus</i> Peters	189
		124 <i>ridgewayi</i> Boulenger	190
		125 <i>paradoxus</i> Günther	190
		126 <i>maynardi</i> Alcock	191
		127 <i>pinna</i>	192

	Page		Page
Gen. 30. <i>Rhynchophis Moc-</i>		171. <i>tristis Daudin</i>	248
<i>guard</i>	192	172. <i>subocularis Boulenger</i> ..	249
126. <i>boulengeri Mocguard</i> ..	193	173. <i>caudolineata Gray</i>	250
Gen. 31. <i>Coronella Laurenti</i> ..	193	Gen. 35. <i>Chrysopelea Boie</i> ..	250
127. <i>brachyura Günther</i>	195	174. <i>ornata Shaw</i>	251
Gen. 32. <i>Oligodon Boie</i>	195	175. <i>taprobanica Smith</i>	254
128. <i>cyclurus Cantor</i>	202	176. <i>paradisi Boie</i>	254
129. <i>chinensis Günther</i>	206	Gen. 36. <i>Lycodon Boie</i>	255
130. <i>juglandifer Wall</i>	207	177. <i>subcinctus Boie</i>	258
131. <i>macrurus Angel</i>	207	178. <i>travancoricus Beddome</i> ..	259
132. <i>formosanus Günther</i> ...	208	179. <i>laeensis Günther</i>	259
133. <i>tæniatus Günther</i>	208	180. <i>kundui Smith</i>	260
134. <i>quadrilineatus Jan</i>	210	181. <i>jara Shaw</i>	260
135. <i>barroni Smith</i>	210	182. <i>striatus Shaw</i>	261
136. <i>alboinectus Cantor</i>	211	183. <i>flavomaculatus Wall</i> ..	262
137. <i>melazonotus Wall</i>	213	184. <i>mackinnoni Wall</i>	263
138. <i>splendidus Günther</i>	214	185. <i>aulicus Linn.</i>	263
139. <i>cinereus Günther</i>	215	186. <i>fasciatus Anderson</i>	266
140. <i>joynsoni Smith</i>	218	187. <i>paucifasciatus Rendahl</i> ..	267
141. <i>woodmasoni Sclater</i> ...	218	Gen. 37. <i>Cercaspis Wagler</i> ...	267
142. <i>torquatus Boulenger</i> ..	219	188. <i>carinatus Kuhl</i>	268
143. <i>theobaldi Günther</i>	220	Gen. 38. <i>Dinodon Dum. &</i>	
144. <i>cruentatus Günther</i> ...	221	<i>Bib.</i>	269
145. <i>planiceps Boulenger</i> ...	221	189. <i>septentrionalis Günther</i> ..	270
146. <i>venustus Jerdon</i>	222	190. <i>gammici Blanford</i>	271
147. <i>travancoricus Beddome</i> ..	223	191. <i>flavozonatus Pope</i>	271
148. <i>tæniolatus Jerdon</i>	223	Gen. 39. <i>Dryocalamus Gün-</i>	
149. <i>arnensis Shaw</i>	225	<i>ther</i>	272
150. <i>sublineatus Dum. & Bib.</i> ..	227	192. <i>nympha Daudin</i>	274
151. <i>calamarius Linn.</i>	228	193. <i>davisoni Blanford</i>	274
152. <i>erythrorhachis Wall</i> ..	229	194. <i>gracilis Günther</i>	275
153. <i>melaneus Wall</i>	229	Gen. 40. <i>Sibynophis Fitzinger</i> ..	276
154. <i>affinis Günther</i>	230	195. <i>collaris Gray</i>	277
155. <i>brevicauda Günther</i> ...	231	196. <i>chinensis Günther</i>	278
156. <i>erythrogaster Boulenger</i> ..	232	197. <i>subpunctatus Dum. &</i>	
157. <i>catenata Blyth</i>	232	<i>Bib.</i>	279
158. <i>medougalli Wall</i>	234	198. <i>bistrigatus Günther</i> ...	279
159. <i>dorsalis Gray & Hard-</i>		199. <i>grahami Boulenger</i>	280
<i>wicke</i>	234	200. <i>sagittarius Cantor</i>	280
160. <i>hamptoni Boulenger</i> ...	235	Gen. 41. <i>Natrix Laurenti</i>	281
161. <i>lacroixi Angel & Bourret</i> ..	236	201. <i>nuchalis Boulenger</i>	284
Gen. 33. <i>Calamaria Boie</i>	236	202. <i>venningi Wall</i>	286
162. <i>pavimentata Dum. &</i>		203. <i>sauteri Boulenger</i>	287
<i>Bib.</i>	238	204. <i>atemporalis Bourret</i>	287
163. <i>uniformis Smith</i>	238	205. <i>parallela Boulenger</i>	288
164. <i>septentrionalis Boulenger</i> ..	239	206. <i>nicobariensis Sclater</i> ..	289
Gen. 34. <i>Ahætulla Link</i>	239	207. <i>khasiensis Boulenger</i> ..	289
165. <i>ahætulla Linn.</i>	242	208. <i>modesta Günther</i>	290
166. <i>cyanochloris Wall</i>	244	209. <i>peali Sclater</i>	291
167. <i>grandoculis Boulenger</i> ..	245	210. <i>xenura Wall</i>	292
168. <i>gorei Wall</i>	246	211. <i>punctulata Günther</i>	292
169. <i>bifrenalis Boulenger</i> ...	246	212. <i>pisoator Schneider</i>	293
170. <i>caudolineolata Günther</i> ..	247		

	Page		Page
213 triangular germ flow	*94	Gen 51 <i>Opisthostrobus</i>	
214 bell la Stol caba	*98	<i>Günther</i>	330
215 peracuinata <i>Boulenger</i>	*99	245 <i>balteatus</i> Cope	331
*16 angel <i>Bourret</i>	300	246 <i>premax illaris</i> Angel	332
*17 himalayana <i>Cather</i>	300	247 <i>lateralis</i> <i>Boulenger</i>	332
*18 <i>acutus ala Schlegel</i>	300	*48 <i>andersoni</i> <i>Boulenger</i>	333
219 <i>atolata</i> <i>Lin</i>	303	249 <i>spenceri</i> <i>Smith</i>	333
220 <i>platycopa</i> <i>Blyth</i>	303	*50 <i>jacob Angel & Bourret</i>	333
*21 <i>beddomei</i> <i>Günther</i>	306	251 <i>annamensis</i> <i>Bourret</i>	334
*22 <i>n groenlandia</i> <i>Blyth</i>	307	Gen. 52 <i>Aspidura</i> <i>Wagler</i>	334
223 <i>monticola</i> <i>Jordan</i>	318	252 <i>brachyrrhinus</i> <i>Bass</i>	336
*24 <i>chrysargus</i> <i>Bour</i>	319	253 <i>cep</i> <i>Günther</i>	336
225 <i>ca. chinensis</i> <i>Bourret</i>	309	254 <i>trachypocla</i> <i>Cope</i>	337
Gen 42 <i>Balanophus</i> <i>Smith</i>	310	255 <i>diamond hayi</i>	
226 <i>cylindrus</i> <i>Günther</i>	310	<i>Boulenger</i>	338
Gen 43 <i>Pseudoxenodon</i>		*56 <i>guentheri</i> <i>Ferguson</i>	339
<i>Boulenger</i>	311	Gen 53 <i>Blythia</i> <i>Therold</i>	339
227 <i>macrops</i> <i>Blyth</i>	311	257 <i>reticulata</i> <i>Blyth</i>	339
228 <i>bambusaicola</i> <i>Fogt</i>	313	Gen 54 <i>Haplocercus</i> <i>Günther</i>	340
229 <i>pope</i> <i>Gressitt</i>	314	*58 <i>cylindrus</i> <i>Günther</i>	341
Gen. 44 <i>Macropustodon</i>		Gen 55 <i>Xylophus</i> <i>Beddome</i>	341
<i>Boulenger</i>	314	259 <i>perrotet</i> <i>Dum & Bib</i>	342
230 <i>plumbicolor</i> <i>Cantor</i>	314	*60 <i>stenorhynchus</i> <i>Günther</i>	343
Gen. 45 <i>Parachadophus</i>		Gen. 56 <i>Bogza</i> <i>Fischer</i>	344
<i>Bourret</i>	316	*61 <i>multimaculata</i> <i>Bass</i>	347
231 <i>chapaensis</i> <i>Bourret</i>	316	262 <i>ochracea</i> <i>Günther</i>	348
Gen 46 <i>Xendochrophus</i>		*63 <i>trigonata</i> <i>Schneider</i>	349
<i>Günther</i>	317	264 <i>gokool</i> <i>Gray</i>	351
232 <i>cerasogaster</i> <i>Cantor</i>	317	*65 <i>regiosus</i> <i>Günther</i>	351
Gen 47 <i>Astrotum</i> <i>Cope</i>	319	*66 <i>quincun lala</i> <i>Wall</i>	353
233 <i>achustomum</i> <i>Daudon</i>	319	267 <i>barnes</i> <i>Günther</i>	354
234 <i>yunnanensis</i> <i>Anderson</i>	320	268 <i>cyanea</i> <i>Dum. & Bib</i>	355
Gen. 48 <i>Trachuchium</i>		269 <i>mult temporala</i> <i>Bourret</i>	356
<i>Günther</i>	321	*70 <i>mult fasciata</i> <i>Blyth</i>	357
*35 <i>monticola</i> <i>Cantor</i>	322	*71 <i>erythron</i> <i>Bour</i>	357
236 <i>fucum</i> <i>Blyth</i>	322	*72 <i>forsteri</i> <i>Dum & Bib</i>	358
237 <i>guentheri</i> <i>Boulenger</i>	323	*73 <i>clinton</i> <i>Boulenger</i>	359
238 <i>tenuiceps</i> <i>Blyth</i>	323	Gen 57 <i>Tarphophus</i> <i>Fischer</i>	
239 <i>love</i> <i>Peracca</i>	324	<i>mann</i>	360
Gen. 49 <i>Plagopholis</i>		274 <i>rhinopoma</i> <i>Blanford</i>	360
<i>Boulenger</i>	324	Gen 58 <i>Psammophis</i> <i>Fitzinger</i>	
240 <i>blakewayi</i> <i>Boulenger</i>	325	275 <i>whokari</i> <i>Forster</i>	361
241 <i>delacour</i> <i>Angel</i>	326	276 <i>condanatus</i> <i>Merrim</i>	364
242 <i>puhalia</i> <i>Boulenger</i>	326	*77 <i>longifrons</i> <i>Boulenger</i>	365
Gen. 50 <i>Rhabdops</i> <i>Boulenger</i>	327	278 <i>le thi</i> <i>Günther</i>	366
243 <i>ol vacuus</i> <i>Beddome</i>	328	279 <i>hucolatus</i> <i>Brandt</i>	367
244 <i>neolor</i> <i>Blyth</i>	328	Gen. 59 <i>Psammodynastes</i>	
		<i>Günther</i>	368
		280 <i>pulverulentus</i> <i>Bass</i>	368

	Page		Page
Gen. 60. <i>Dryophis Dalman</i> ..	370	309. <i>flaviceps Reinhardt</i>	410
281. <i>perroteti Dum. & Bib.</i> ..	373	310. <i>fasciatus Schneider</i>	411
282. <i>dispar Günther</i>	373	311. <i>cæruleus Schneider</i>	413
283. <i>fronticinctus Günther</i> ..	374	312. <i>ceylonicus Günther</i>	415
284. <i>prasinus Boie</i>	375	313. <i>multicinctus Blyth</i>	416
285. <i>mycterizans Linn.</i>	376	314. <i>candidus Linn.</i>	416
286. <i>nasutus Lacépède</i>	376	315. <i>magnimaculatus Wall</i> <i>& Evans</i>	417
287. <i>pulverulentus Dum. &</i> <i>Bib.</i>	378	316. <i>niger Wall</i>	417
Subfam. HOMALOPSINÆ	379	317. <i>lividus Cantor</i>	418
Gen. 61. <i>Enhydria Sonn. &</i> <i>Latr.</i>	380	318. <i>walli Wall</i>	418
288. <i>plumbea Boie</i>	382	Gen. 71. <i>Callophis Gray</i>	418
289. <i>enhydria Schneider</i>	383	319. <i>melanurus Shaw</i>	420
290. <i>jagorii Peters</i>	384	320. <i>maculiceps Günther</i>	420
291. <i>innominata Morice</i>	385	321. <i>hugli Cochran</i>	421
292. <i>smithi Boulenger</i>	385	322. <i>nigrescens Günther</i>	422
293. <i>longicauda Bourret</i>	386	323. <i>beddomei Smith</i>	423
294. <i>bennetti Gray</i>	386	324. <i>maeclellandi Reinhardt</i> ..	423
295. <i>chinensis Gray</i>	387	325. <i>bibroni Jan</i>	425
296. <i>maculosa Blanford</i>	387	326. <i>kelloggi Pope</i>	426
297. <i>bocourti Jan</i>	388	Gen. 72. <i>Naja Laurenti</i>	426
298. <i>dussumieri Dum. & Bib.</i> ..	389	327. <i>naja Linn.</i>	427
299. <i>sieboldi Schlegel</i>	389	328. <i>hannah Cantor</i>	436
Gen. 62. <i>Homalopsis Kuhl &</i> <i>Hass.</i>	390	Fam. 10. <i>Hydrophiidæ</i>	430
300. <i>buccata Linn.</i>	390	Gen. 73. <i>Laticauda Laurenti</i> ..	442
Gen. 63. <i>Cerberus Cuvier</i>	392	329. <i>laticaudata Linn.</i>	442
301. <i>rhynchops Schneider</i> ...	393	330. <i>colubrina Schneider</i> ...	443
Gen. 64. <i>Gerardia Gray</i>	394	Gen. 74. <i>Aepyurus Lacépède</i> ..	445
302. <i>prevostiana Eyd. &</i> <i>Gerv.</i>	394	331. <i>eydouxii Gray</i>	445
Gen. 65. <i>Fordonia Gray</i>	396	Gen. 75. <i>Kerilia Gray</i>	446
303. <i>leucobalia Schlegel</i>	396	332. <i>jerdoni Gray</i>	447
Gen. 66. <i>Cantoria Girard</i>	397	Gen. 76. <i>Præsentata Wall</i> ...	447
304. <i>violacea Girard</i>	398	333. <i>viperina Schmidt</i>	448
Gen. 67. <i>Bitia Gray</i>	399	Gen. 77. <i>Enhydrina Gray</i> ...	449
305. <i>hydroides Gray</i>	400	334. <i>schistosa Daudin</i>	449
Gen. 68. <i>Herpeton Lacépède</i> ..	400	Gen. 78. <i>Hydrophis Latreille</i> ..	451
306. <i>tentaculatum Lacépède</i> ..	401	335. <i>nigrocinetus Daudin</i> ...	452
Fam. 8. <i>Dasypeltidæ</i>	403	336. <i>spiralis Shaw</i>	453
Gen. 69. <i>Elachistodon Rein-</i> <i>hardt</i>	404	337. <i>cyanocinctus Daudin</i> ..	454
307. <i>westermanni Reinhardt</i> ..	404	338. <i>obscurus Daudin</i>	457
Fam. 9. <i>Elapidæ</i>	406	339. <i>klossii Boulenger</i>	457
Gen. 70. <i>Bungarus Daudin</i> ..	407	340. <i>bituberculatus Peters</i> ..	458
308. <i>bungaroides Cantor</i>	410	341. <i>stricticollis Günther</i> ...	459
		342. <i>torquatus diadema</i> <i>Günther</i>	460
		343. <i>ornatus ornatus Gray</i> ..	460
		344. <i>lapemoides Gray</i>	461
		345. <i>mamillaris Daudin</i>	462
		346. <i>cærulescens Shaw</i>	463
		347. <i>fasciatus Schneider</i>	464

	Page		Page
345 <i>parvipes</i> Smith	465	Gen 83 <i>Frustaphis</i> Alcock	
349 <i>brookii</i> Günther	463	<i>& Penn.</i>	452
Gen. 79 <i>Thalassaphis</i> Schmidt	459	361 <i>maculatus</i> Alcock &	
350 <i>anomalous</i> Schmidt	459	<i>Penn.</i>	492
Gen. 80 <i>Halimaphis</i> Smith	467	Subfam. <i>Chrotastinae</i>	484
351 <i>annandalei</i> Loeb	45	Gen 91 <i>Anostomus</i> Bleeker	
Gen 81 <i>Lepomis</i> Gray	483	<i>nove</i>	484
352 <i>hardwickii</i> Gray	483	365 <i>himalayensis</i> Günther	493
353 <i>curtus</i> Shaw	470	366 <i>rhodostomus</i> Bleeker	497
Gen. 82 <i>Ambly</i> & Fowler	471	367 <i>halys</i> Pallas	499
354 <i>stokessii</i> Gray	471	368 <i>hypnale</i> Verreux	499
Gen. 83 <i>Microcephalophis</i>		369 <i>oxy</i> Lawrence	500
<i>Lesson</i>	472	370 <i>acutus</i> Günther	501
355 <i>gracilis</i> Shaw	472	Gen 91 <i>Trimacurus</i> Loeb	
356 <i>caudatus</i> Günther	473	<i>pale</i>	502
Gen. 84 <i>Pelamis</i> Dunal	475	371 <i>maculipes</i> Boulenger	503
357 <i>platyrus</i> Linna	476	372 <i>trigonocephalus</i> Bonn	
Fam 11 <i>Viperidae</i>	477	<i>& Loeb</i>	506
Subfam. <i>Viperinae</i>	479	373 <i>microgynatus</i> Loeb	507
Gen. 85 <i>Monaspis</i> Boulenger	480	374 <i>monticola</i> Günther	508
358 <i>form Boulenger</i>	480	375 <i>pyralis</i> Günther	510
Gen. 86 <i>Vipera</i> Latre	480	376 <i>kalbarki</i> Smith	512
359 <i>sumelli</i> Shaw	483	377 <i>malabaricus</i> Jordan	513
360 <i>lebetus</i> Penn	486	378 <i>strigatus</i> Gray	518
Gen. 87 <i>Echin</i> Mervin	487	379 <i>corvus</i> Smith	514
361 <i>carnatus</i> Schneider	497	380 <i>gracilis</i> Shaw	515
Gen. 88 <i>Pseudocraerus</i>		381 <i>stejnegeri</i> Schmidt	517
<i>Boulenger</i>	490	382 <i>popovii</i> Smith	518
362 <i>pernatus</i> Dunal & Btl	490	383 <i>kalbarki</i> Smith	518
363 <i>bicornis</i> Wall	492	384 <i>caudatus</i> Blyth	519
		385 <i>purpuronotatus</i>	
		<i>Gray & Hard</i>	520
		386 <i>erythrinus</i> Cantor	522
		387 <i>albolabris</i> Gray	523
		388 <i>labialis</i> Fitzinger	525
		APPENDIX	
		62 a. <i>Rhaphis</i> <i>guttata</i>	
		<i>latus</i> <i>Dunacoryphala</i>	526

INTRODUCTION.

The Bibliography of this Chapter is given on p. 35.

THE Serpentes or Snakes are a suborder of the order Squamata, which includes, besides the Sauria or Lizards, the extinct Pythonomorpha, Aigialosauria, and Dolichosauria. They can be distinguished from lizards by the following combination of characters :—

The two halves of the mandible are united at the symphysis by elastic ligament and are movable independently ; the anterior end of the brain-case is completely, or nearly completely, closed ; the vertebræ, in addition to the anterior and posterior zygapophyses, have a pair of accessory articulations dorsal to them, namely, the zygantrum and zygosphene ; the body is greatly elongated and without limbs, or with merely vestiges of a hind pair ; the eyes are without lids ; there is no ear-opening ; the tongue is elongate and more or less deeply forked, and is retractile into a basal sheath. Like the lizards the body is covered with scales, the vent transverse, and the copulatory organs paired.

The close relationship between the two groups is shown also in the peculiarly ophidian characters which have arisen independently in certain of the Saurian families. These are the ophidian type of vertebræ in the Iguanidæ ; the elongation of the body and the disappearance of the limbs in the Pygopodidæ, Anguidæ, Teiidæ, Amphisbænidæ, and Scincidæ ; the eye-covering in the Pygopodidæ, Teiidæ, Scincidæ, and Lacer tidæ ; the tongue in the Varanidæ ; and the approach to the ophidian type of ear in the Agamidæ.

About 2,500 species of snakes are known.

Much has been written upon the anatomy of snakes, but no complete account of any one species, comparable with those which have been written on the Frog, the Salamander or the Tortoise, is, as yet, available. The following general remarks on structure, habits, distribution, etc., have particular reference to the Oriental species. They deal also with the recent advances in knowledge concerning snakes, and suggest lines for further research.

It has been truly said that we do not know a species until we know everything about it, its anatomy, its physiology, its development, its habits. The variations in structure in different families and genera, sometimes even in species that are placed in the same genus, have no doubt their interpretation in their varying modes of life and the correlation of the two is a fascinating study. It is one that has been much neglected by the field naturalist. Here is a great field of research waiting for him, for it is upon the living creature that all our theories concerning the function of structure must finally be tested.

The Teeth.

Teeth are present in the majority of snakes on the maxillary, palatine, pterygoid and mandibular bones, in the primitive families they may be present also upon the premaxilla. In some genera they are much reduced in number and size, but in none are they completely lost. They are not implanted in true sockets, but simply ankylosed to the bone, leaving, when detached, a shallow impression. From an evolutionary standpoint the main changes in dentition have occurred on the maxillary bone, and its value for taxonomic purposes is much greater than that of any other bone of the palato-maxillary arch. Its shape also and its position with regard to the other bones of the arch are sometimes of value. An accurate count of the number of teeth is important, and to do this the maxilla or the entire arch may have to be removed, cleaned, and dried, any impressions from teeth that have dropped out can then be seen. In some specimens every alternate tooth has dropped out, so that the jaw appears, on superficial examination, to possess only half the real number. There is a perpetual succession of teeth, the new ones lying in the gum on the inner side. These replacement teeth, in different stages of development, can often be seen, sometimes as many as three or four sets lying in vertical series, one above the other. Three types of teeth are distinguished namely, solid, grooved, and canaliculate. Solid teeth (aglyphous) occur in all the primitive snakes, and in more than half the Colubridæ. The grooved teeth of the Ophioglyphæ are confined to the last two or three maxillary teeth. They are usually larger than the others. The groove is on the external or antero-external surface of the tooth, it varies considerably in depth in different species, and may be so slight that some magnification is required to see it. It communicates by a duct or ducts with the poison gland above. The canaliculate fangs of the Proteroglyphæ (Elapidæ) and Solenoglyphæ (Viperidæ) are found only in the front of the mouth. The canal has been derived from the grooved condition by its extension into the tooth so that a horse shoe shaped condition is finally

produced when seen in transverse section. The ring is then completed by filling in the gap between the two heels of the shoe, and not by union of the real structures of the tooth, namely, the dentine and enamel. How poor is this connection in the Elapidæ, in which the line of union is visible, can be shown by decalcifying the tooth, when the filling disappears and the groove is reinstated. The Cobra, in fact, can be returned to the opisthoglyphs. In the Viperidæ the union is more perfect and cannot be removed in the same way. This striking contrast between the two families is evidence not only of the separate, but also of the older, origin of the Vipers. Poison fangs, like the other teeth in the jaws, are replaced by succession. In the Viperidæ a cluster of three or four or more reserve teeth can often be seen; in the Elapidæ only one or two can be seen with the naked eye. There is no direct attachment of the poison duct to the fang. When it reaches the base of the tooth it expands into a small cavity in the fold of the gum, overlying the opening into the canal. The loss of the tooth, therefore, does not cause any injury to the duct, and no repair is needed. The supply of venom is always ready for the next tooth, which is almost in position before the old one is shed.

It is convenient here to state that there is no single character, except that of the poison fangs, by which to distinguish the harmless snakes from the poisonous ones. In some species (*Callophis*) the fang is extremely small, and usually needs some magnification to decide its nature. All the Elapidæ lack a loreal shield, but this is absent also in many harmless snakes, particularly in members of the *Trachischium-Opisthotropis* group. Wall, in his 'Poisonous Terrestrial Snakes of our British Indian Dominions,' has produced a very serviceable key for their identification. It would not, however, cover all those included in this work.

The Eye.

The eyes differ greatly in size, sometimes in species which belong to the same genus. They are usually free from the surrounding shields, and are covered with a transparent disc, like a watch-glass, beneath which they move. In most of the Uropeltidæ the disc is confluent with the shields which surround the eye. The evolution of the transparent disc, or "spectacle" or "window," is not clearly known. The formation of a similar covering originating in the lower eyelid of some genera of Lizards (Seincidæ, Lacertidæ) is well known, and the investigations of Schwartz-Karsten (1933) present grounds for believing that the snakes have acquired it by the

same process. Nehrer on the other hand (1935) gives quite a different interpretation of it. The subject has also been discussed by Walls (1934) and Verrill (1936).

The pupil is usually circular or vertically elliptic, only in *Dryophis* and its allies is it horizontal. In some genera such as those of the *Trachischium-Opisthotropus* group it may be round or vertically elliptic and it is often difficult to decide which to call it. The variation appears to depend upon the form of contraction at the time of death. In the Boidea the Viperidae and in *Bonga* it is very distinctly vertical and is capable of contracting to a mere slit.

The presence of a round or vertical pupil is not necessarily correlated with diurnal and nocturnal habits. The Kraits (*Bungarus*) and Cobras (*Naja*) with round pupil are crepuscular and nocturnal as are the Freshwater Snakes (*Hemiaspina*) on the other hand many of the Vipers (*Vipera* *Ancistrodon*) although seeking their food at night do not shun the daylight. *Dryophis* with a horizontal pupil is strictly diurnal and owing to the pointed character of its snout is said to have binocular vision.

Abertromby (1922) has stated that the sight of snakes is not good in the daytime even in the case of diurnal snakes with round pupilled eyes and that those snakes that hunt their prey instead of waylaying it do so chiefly by means of the tongue. I have not observed this myself in snakes of diurnal habits but have noticed it frequently in nocturnal snakes with round pupilled eyes. Cobras that I have kept in captivity always had the greatest difficulty in seizing their food in daylight. Even such slow moving creatures as toads were struck at and missed time and again before they were finally seized.

An interesting point concerning the vision of snakes has recently been brought forward by Walls (1931). He discovered that the lens of the eye was yellow in certain species colourless in others and found that he could correlate the difference in colour with diurnal and nocturnal habits. The yellow coloration when present is an adaptation for the improvement of visual acuity in daylight. The subject is worth further investigation particularly in such genera as *Bungarus* which combine nocturnal habits with a round pupil.

The Ear

Snakes have neither external ear-opening tympanum tympanic cavity nor eustachian tube. The auditory apparatus consists of a bony or semicartilaginous rod the stapes or columella auris which extends from the fenestra ovalis in the cranium to the quadrate bone. Its attachment to the former is by means of the "foot" to the quadrate it is loosely

connected by ligamentous tissue so that considerable play is possible. Owing to its extreme slenderness this bone is usually lost when preparing skulls. It is difficult to say how

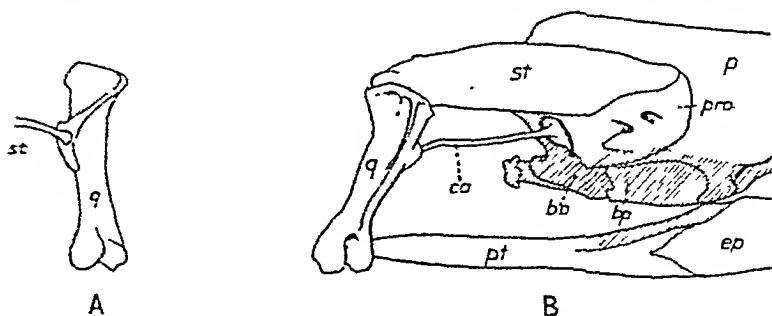


Fig. 1.—Ear-bones of *Python reticulatus*.

- A. Attachment of stapes, *st.*, to quadrate *q.*, seen from the inside.
 B. Auditory apparatus, seen from the right side. *bo.*, basioccipital;
bp., basisphenoid; *ca.*, columella auris or stapes; *ep.*, ectopterygoid
 (or transpalatino); *p.*, parietal; *pro.*, prootic; *pt.*, pterygoid;
q., quadrate; *st.*, supratemporal.

much this lack of auditory apparatus has affected their hearing, or whether they have any compensatory mechanism to make up for it, but that they can hear very well is indisputable.

The Tongue and Jacobson's Organ.

The tongue is mainly an organ for smell, and the constant quiver and play of it that we know so well, is for the purpose of collecting scent-particles, which are then passed on to Jacobson's organ through the naso-palatine ducts. The organ lies in the roof of the mouth, enclosed in a cavity formed by the turbinal bone above and the vomer below. It is usually deeply pigmented. It is innervated by the vomero-nasal nerve, a thick trunk of fibres, a special outgrowth of the olfactory bulb (figs. 7, C and 44, C).

The Scales of the Body.

The scales on the body are usually imbricate and form straight longitudinal and oblique transverse series. Wall has called them "costal," but the word "dorsal" is a much older one and equally descriptive. The longitudinal series in the great majority of snakes are disposed in odd numbers; in *Zaocys* they are in even numbers; in the aquatic *Acrochordus* and in the Sea Snake *Kolpophis annandalei* they are very small and more or less granular in form, and an exact count is difficult.

The scales vary considerably in shape. They may be long and narrow with pointed tips as in *Ahaetulla* and *Dryophis* broad and leaf like in shape as in some species of *Trimere* curved as broad or nearly as broad as long as in *Ptyas* and *Zaocys* with every gradation between these extremes. In the majority of species the outer row or rows are larger than the others. In most of those that have suffered reduction in the number of scale rows e.g. *Calamaria* *Dryocalamus* and *Blythia* the scales are of equal size. In some genera e.g. *Boiga* *Ahaetulla* and *Bungarus* the vertebral series are enlarged. In some species of *Natrix* the tips of the scales are bidentate. Very little attention has been paid to the size and shape of the dorsal scales and they are worth a closer study.

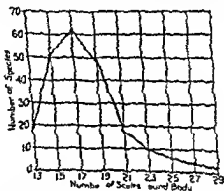


Fig 2—Chart showing the variation in the number of scale-rows in the Colubridae

The scales may be smooth or feebly or strongly keeled the keels are usually stronger in the males than in the females. In both sexes they are often stronger in the posterior part of the body than in the anterior. Those of the *Bufo* group of the Colubridae are more strongly keeled than are those of the Colubrine. Dermal ossifications are unknown in snakes.

The apical pits are minute impressions near the tips of the scales. They may be single as in *Ahaetulla* or paired as in *Eloph*. Sometimes both forms are to be found in the same snake. In some species they are easily seen, in others they can only be found by careful search. A poor impression is better seen on a dried scale than on a wet one. To have it in the right light is also important. The significance of these pits is not known. Their systematic importance is slight but

it should not be ignored. In some cases they are of value in defining a genus, as in *Contia* and *Liopeltis*; in others they are useless as a generic character.

The number of scale-rows round the body varies considerably. The lowest is 13 (*Dryocalamus*, *Liopeltis*, *Calamaria*); the greatest is in *Python* (65-75), *Kolpophis* (74-93), and *Acrochordus* (130-150). The majority of the Colubridæ have 15, 17 or 19 rows at mid-body, and the accompanying graph, showing the variation, is based on the species described in this volume.

The maximum number of scale-rows in the majority of snakes is at mid-body, and in most there is a reduction as the vent is approached. Considerable attention has been paid in recent years to the manner in which this reduction occurs. It may take place by absorption of the vertebral rows or of those on the sides of the body, usually the 3rd or 5th. As an addition to the description of a species the point is of value; very occasionally it may help in the differentiation of two closely allied species, as in *Coluber ventromaculatus* and *C. rhodorhachis*; that it has any higher systematic value is doubtful. The number of scale-rows at mid-body is of much greater importance than at any other part of the body. When counts are made at the neck or hinder part of the body they should not be rigidly confined to any particular distance behind the head or in front of the vent.

The ventral shields or gastrosteges are the enlarged scales along the mid-line of the belly. They are usually transversely enlarged, much broader than long, and occupy the whole or nearly the whole width of the belly. In the Freshwater Snakes (Homalopsinæ) they occupy about one-half the width of the body, whilst in *Xenopeltis*, the Uropeltidæ, and most of the Sea Snakes they are scarcely larger than the scales adjacent to them. In the Typhlopidae and Leptotyphlopidae they are not distinguishable as ventrals, the body being covered with uniformly-sized scales throughout.

In some genera, e. g. *Elaphe* and *Lycodon*, a lateral ventral keel is present; in the arboreal *Ahaetulla* and *Chrysopelea* the keel is strongly developed and is provided in addition with a notch on its posterior border.

The subcaudals or urosteges are usually disposed in pairs. In many species which are in no way related to one another, such as *Natrix*, *Bungarus*, and *Trimeresurus*, some or all of the subcaudal shields may be single; the reduction usually starts at or near the vent.

The number of ventral and subcaudal shields is of considerable specific value. Owing to the shorter tail, the number of caudals is often less in the female than in the male. In some species this sexual distinction in caudal count is very marked,

e.g. *Trimeresurus* and *Calamoria*, and has systematic importance. The number of the ventral and subcaudal shields corresponds closely to the number of vertebrae, and therefore to the number of the somites or segments of the body.

The anal shield, the shield that covers the vent, may be divided or entire, as with the subcaudals, the paired condition is the more primitive.

Picardo (1931), Holtzinger Tenever (1935), and Pockrandt (1937) have drawn attention to the fact that the microscopic structure of the scales can show valuable specific characters.

The Umbilicus.

The umbilicus is situated on the posterior part of the belly from six to ten heads lengths in front of the vent. It is a long slit like scar, and occupies from two to four ventral scales. The scar is visible for some months after birth and affords a means of distinguishing very young snakes from older ones. Beddard (1907) has pointed out that in the Viperidae the position of the umbilicus appears to have some taxonomic value.

Vestigial Limbs

No snake has a pectoral arch or even vestiges of it, but vestiges of the pelvis are found in the primitive families as shown in the Key (p. 39). The vestigial bone, usually regarded as the femur, which has persisted in the Boidae and

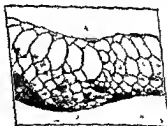


Fig. 2 — Photograph of anal region of *Python molurus*, showing vestigial hind limbs.

Anolis, terminates in a claw-like spur and lies in a rounded hole or depression on each side of the vent. In some, especially in the males, it projects beyond the opening, and can be easily seen, in others it is more deeply hidden, and must be searched for.

The Vertebral Column.

The presence or absence of hypapophyses on the posterior dorsal vertebræ has long been recognized as a character which divides the Colubridæ into two main groups, the Natricine with hypapophyses, and the Colubrine, or Coronelline, without

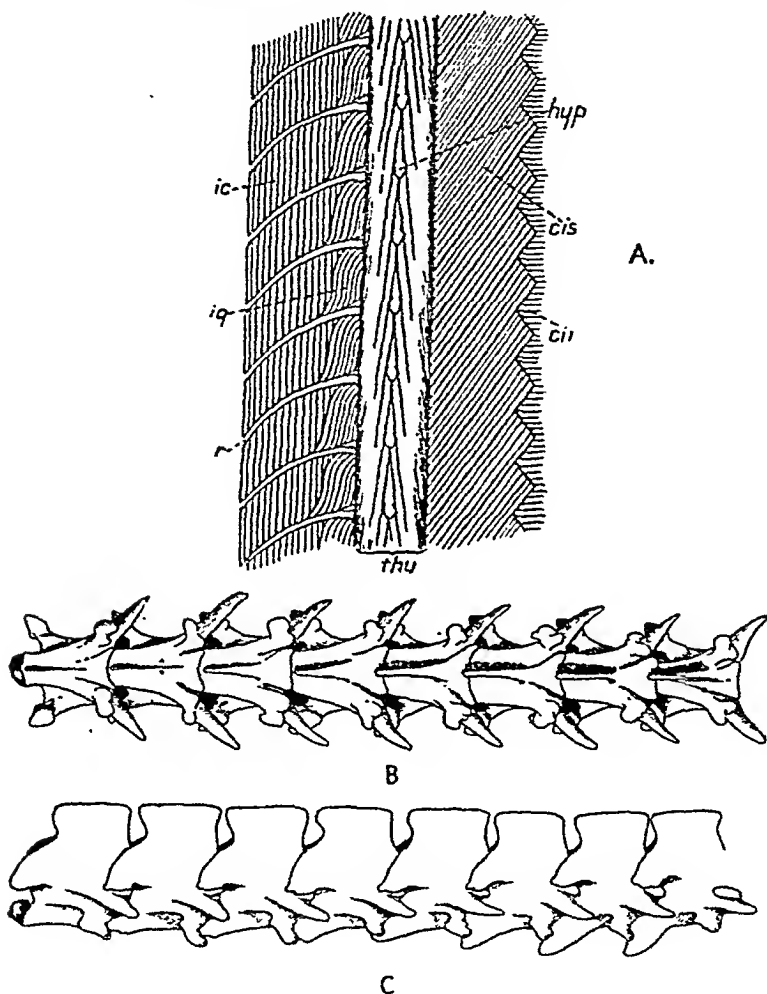


Fig. 4.—A. Ventral view of body wall of *Natrix piscator*. The M. costalis internus superior has been removed on the left side. B. Ventral, and C. Lateral, view of anterior dorsal vertebræ of *Ptyas mucosus*, showing the change from the hypophysial to the anhypophysial area.

cis., M. costalis internus inferior; cis., M. costalis internus superior; hyp., hypapophysis of vertebra; ic., M. intercostalis proprius; iq., M. intercostalis quadrangularis; r., rib; thy., M. transverso-hypapophyseus.

them. No account of these processes however can be complete that does not include the muscles—the M transverso hypopharyngeus—which are concerned with them. They can be seen at once by opening the belly along the mid line and pushing the viscera aside and form quite as effective a means of ascertaining the presence or absence of the processes as the bones themselves. As seen in *Latrix piscator* the muscle consists of two conspicuous parallel bundles of fibres one on each side of the vertebral line the hypapophyses projecting between them. Each muscle arises from the anterior aspect of the transverse process of the vertebra and passing forwards and slightly inwards is inserted by a flat tendon into the hypapophysis four segments anterior to it. Many additional fibres arise from the muscles which surround it. At any point therefore a transverse section through the whole bundle of fibres will include four muscles. The action of the muscles when contracting simultaneously on both sides is to flex the vertebral column ventrally one side assists the epiaxial muscles of the same side in lateral flexion (Mossner 1935). As seen in *Ptyas mucosus* the muscle is present only in the anterior one fifth of the body. Its disappearance is effected rapidly by successive shortenings of the muscle and is completed in three or four segments of the body. It corresponds with the disappearance of the hypapophyses. No names have yet been given to describe these two great anatomical divisions and it is convenient that we should have them. I propose the term Hypophysis for those with hypapophyses on the posterior dorsal vertebrae and Anhypophysis for those without them. One would expect to find that the possession of the muscle or the Hypophysis would give them some advantage in movement over the Anhypophyses. I have so far failed to discover it.

Mossner recognizes three main myological types among the Snakes namely the Boidae the Colubridae and the Viperidae.

The Hemipenis

As already stated snakes like the lizards, have paired copulatory organs. These lie on either side of the base of the tail forming distinct thickenings so that with a little practice the sex can usually be determined without dissection. It is however not safe to rely on this. Each organ consists of a tube of erectile tissue which can be everted like the finger of a glove. In pairing only one organ is inserted at a time but which one is immaterial and depends upon the sex. The male happens to be at the time of copulation. The external opening for each hemipenis can be seen by lifting up the anal shield. The distal end of the organ is attached to a long

retractor muscle, and upon the state of contraction of this muscle at the time of death depends to a considerable extent the length of the hemipenis. To examine the organ a cut should be made along the mid-line of the tail, starting just behind the vent; the hemipenes will then be seen lying side by side. They are flattened on their inner sides, more rounded externally. The descriptions given in this volume represent one of the organs lying in its natural position. The sulcus spermaticus lies along the outer wall, and to see it best the cut which opens the organ is made longitudinally down the middle of the inner wall.

Cope in 1893 arranged a classification of the snakes based on the characters of the hemipenis; Dunn in 1928, modifying Cope's scheme, made a tentative classification of the American genera of the Colubridæ. After reviewing the Oriental material described in this volume, I find myself unable to base any major classification upon the organ. As a specific character it is most valuable; in many genera also it is remarkably constant; in others, such as *Trimeresurus* and *Oligodon*, it exhibits enormous variation, even in species which in other respects appear closely allied to one another (c. g. *Trimeresurus stejnegeri* and *T. popiorum*).

In the character of the penial structure, the more generalized families of snakes approach the Sauria. In them the organ is short and thick, with convoluted folds or plicæ and without spines (*Uropeltis grandis* excepted). Evolution has led to the formation of calyces, spines, and deep bifurcation. The transition from one type to another, such as the development of spines from the non-spinous (papillose) form, or vice versa, or the production of calyces from the plicate form, is, I believe, a comparatively small step.

The descriptions of the hemipenis in this volume have been written at different times during the last five years, and, in the absence of any standardized method, will be found to vary considerably in pattern. Many of them, based on poorly preserved material, will also need revision.

The Anal Gland.

The anal glands, anal pockets, or cloacal glands, as they are also called, are sausage-shaped structures, that lie on either side of the base of the tail and open at a right angle by a constricted orifice immediately behind the vent. They are smaller in the male than in the female. They vary considerably in size in different species and genera; in *Boiga* they are unusually large. They have been mistaken, at times, for the hemipenis. Their secretion is custard-like in consistency, and varies in colour in different species; usually it is offensive in odour, but in some species is said to be not unpleasant.

The glands are active at all seasons of the year. Noble (1937), working upon the secretion of the glands in North American snakes, came to the conclusion that the scent had no hedonic use.

The Glands of the Head

Our knowledge of the glands of the head is still very imperfect in their number, form, position, and degree of

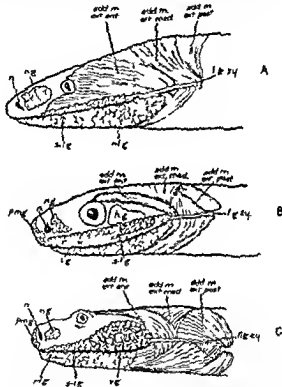
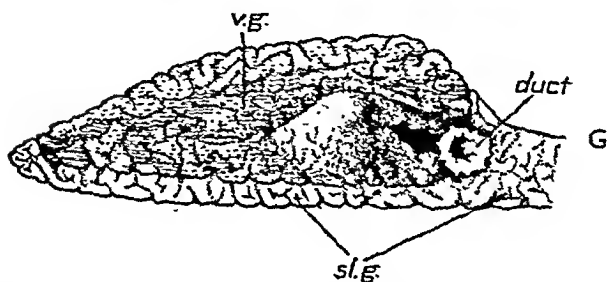
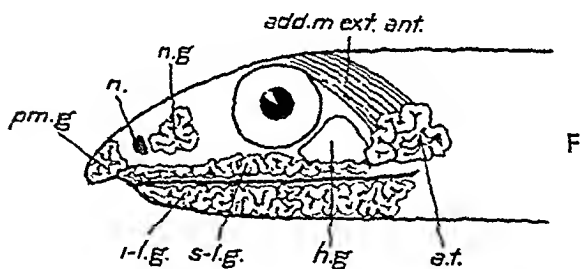
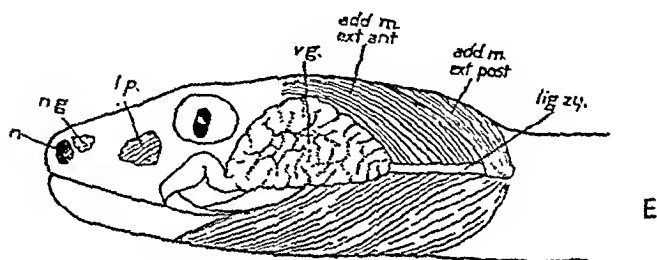
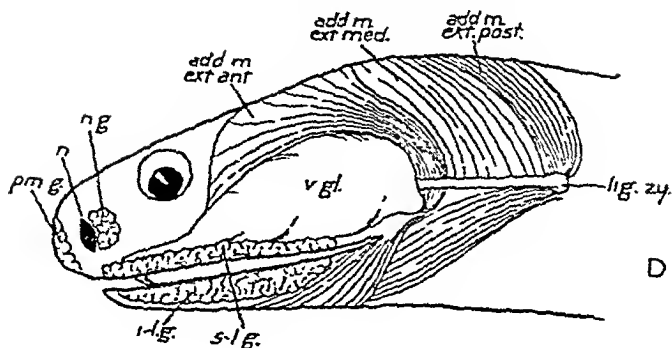


Fig 8—The glands of the head: A. *Xenopeltis unicolor* B. *Phytolucus mucosus* C. *Coluber erythrinus* D. *Naja naja* E. *Trimeresurus erythrinus* The supralabial gland, which is reduced in the vipers, is not shown. F. *Coluber fasciatus* G. Lateral view of parotid and supralabial glands of *Boiga cyrion*, left side. The anterior prolongation of the supralabial gland is not shown.

add m. ext. ant. adductor mandibulae externus anterior; add m. ext. med., adductor mandibulae externus medius; add m. ext. post., adductor



mandibulæ externus posterior; *a.t.*, anterior temporal gland; *duct*, duct of venom gland; *h.g.*, Harderian gland; *i.l.g.*, infra-labial gland; *lig.zy.*, ligamentum zygomatium; *n.*, nostril; *ng.*, nasal gland; *pm.g.*, premaxillary glands; *s.l.g.* supra-labial gland; *v.g.*, venom gland.

development they vary greatly sometimes an species in the same genus. It is astonishing indeed considering the size of the head how much of it is occupied by them. Much more material is needed than is at present available before we can undertake a comprehensive survey of the head glands of any one group. Sarkar (1923) Haas (1931) and Prater (1933) have contributed to our knowledge of the salivary glands in the non poisonous snakes. An excellent summary of the properties of the venom of the poisonous snakes of India has been given by Wall (1928).

Smith and Bellairs have also reviewed the subjects dealing with all the glands of the head (in prep.)

The accompanying figures show the glands of the head. The following can be recognized. A supralabial a parotid, originally derived from the supralabial a premaxillary or intermaxillary also derived from the same gland an inferior labial a nasal an anterior temporal a Harderian a sublingual. The supra- and infralabials the premaxillary the nasal and probably also the anterior temporal are salivary glands they discharge their secretion into the mouth. The parotid in all the Ophitoglyphs and in most of the well-developed Aglyphs is recognizable as a gland distinct from the supralabial by its slightly darker coloration (in spirit specimens). It discharges its secretion by a separate duct into a sac at the base of the maxillary teeth (fig 5 G). The anterior temporal is a small flat gland at the gap of the mouth its duct opening on the margin of the lip beneath the last supralabial scale. When poorly developed and hidden by the ligamentum zygomaticum, it can be easily overlooked. It is not present in all snakes. As far as my examination goes* it is present in the Typhlopidae Aniliidae some of the Boidae (Eryx) and some of the Colubridae. Thus in *Coluber* and *Lytrochilus* it is large and well developed whereas in *Ptyas* and *Elaps* it is small and poorly developed. In *Natrix* it appears to be absent as it is in the Homalopsinae Elapidae and Viperidae. The Harderian gland serves the eye, the nasal cavity and Jacobson's Organ. In shape and size it varies enormously in different species. It consists of a flattened, branched intraorbital portion and an extraorbital one which extends posteriorly beyond the post-frontal bone. This portion may or may not be visible on removing the skin, in most snakes it is hidden beneath the adductor mandibulae externus anterior. The labial glands are strongly adherent to the skin and care must be taken in dissection that they

* The citation of a family or genus does not mean that I have examined all the species contained in it

are not removed with it. The evolution of the venom gland is sketched on pp. 12-13.

Kellaway (1937) and Tait (1938) have shown that complete extirpation of the venom gland does not have any apparent effect upon the health of the snake.

The Vertebral Glands.

The nucho-dorsal, or vertebral, glands (Nakamura, 1935 and Smith, 1938) occur, as far as we know at present, only in some members of the genus *Natrix*, and in the closely allied genera *Macropisthodon* and *Balanophis*. They are present in the neck and may extend the whole length of the body and on to the base of the tail. There are two types, namely, a sacculated one composed of chains of spherical structures, and a non-sacculated one, the gland being composed of a single elongated piece of tissue.

In the first type the gland is composed of paired spherical or oval structures arranged in regular chains on either side of the vertebral line. The scales of the neck of that region are more or less distinctly modified in shape and size. The gland commences on the back of the head, a few millimetres behind the parietal shields; the first ten to twenty pairs are the largest, and these are closely apposed to one another; the succeeding glands, when they occur, are more widely separated. This type of gland is found in *Natrix himalayana*, *N. subminiata*, *N. nigrocincla*, *N. callichroma*, and *Macropisthodon plumbicolor*.

In the second type the scales of the neck are not altered, but on stretching the skin of that part, two elongated, naked areas can be found. The gland is a continuous piece of tissue 10 to 20 mm. in length and lies immediately beneath the naked skin. This type of gland is found in *Balanophis ceylonicus*, and in the Malayan members of the genus *Macropisthodon*. *Natrix callichroma* differs in having the sacculated type, but the external skin characters of the non-sacculated type.

The gland is attached to the skin, and comes away with it when that is stripped from the body. It has neither lumen nor duct. Its secretion is formed by the breaking down of the glandular tissue, and is discharged externally by rupture of the skin covering it. It is an irritant to mucous membranes, but it is doubtful if its purpose is merely defensive. It may be concerned with courtship. In what has been termed the *Natrix* type of courtship, the male rubs his chin along the back of the female. The fact that the species in which this habit has been recorded do not possess the gland does not necessarily invalidate the theory.

The Nasal Cavity,

The nasal cavity is a large chamber extending from the tip of the snout to the anterior wall of the orbit. Into it project from before backwards the nasal pit, the bony capsule of Jacobson's organ and the nasal gland, the three combining to

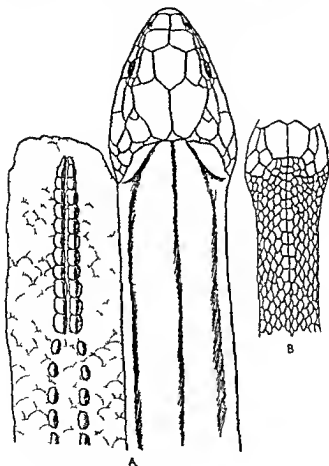


Fig 6—A. Dissection of neck of *Natrix nuchalis* showing vertebral glands. B. Enlarged nuchal scales of *Natrix nuchalis* (after Smith)

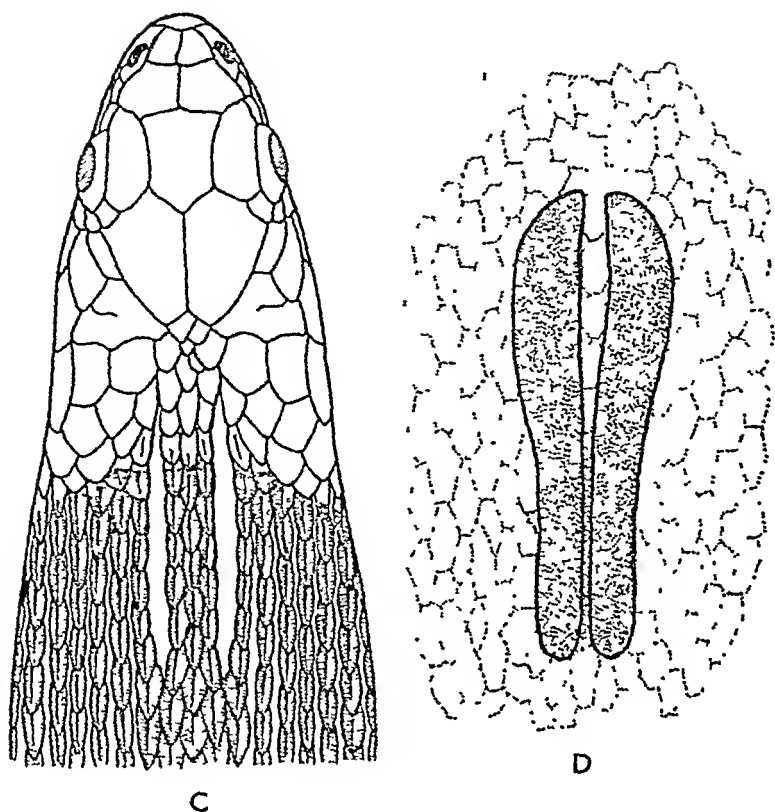


Fig. 6.—C. Neck of *Macropisthodon flaviceps*, showing areas of naked skin. D. Nuchal gland of *M. rhodomelas* as seen by reflecting the skin. The dotted lines indicate the scales seen through the skin (after Smith, P. Z. S. 1938).

produce a sinuous passage when viewed from above (fig. 7, A). The cavity is lined throughout by the olfactory membrane and differs therefore from the nasal cavity of lizards (e. g., *Lacerta*), which is divided into two vestibules, only the posterior of which is covered by olfactory membrane.

Of the three structures, the nasal pad shows the greatest variation. Mesially it is covered by the nasal cartilage, externally it forms the posterior wall of the nasal aperture and has a slit-like or rounded opening which leads into an interior chamber. As thus briefly described, it can be seen in the well-developed Colubridæ and higher families; but there are many modifications.

In the Homalopsinæ, the nostril is a crescentic slit on the upper surface of the snout and the pad projects from its

hinder margin. The opening into the interior of the pad is large, and is directed straight forward. The whole pad can

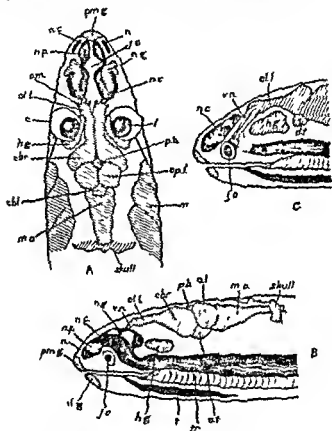


Fig 1—A Horizontal and B & C Sagittal section through the head of *Pyrus mucosa*. To show the various structures properly, the sections have been made at various levels.

obl, cerebellum; cbr, cerebrum; e, eye; ag, Harderian gland; ilg, infraorbital gland; jo (B & C) Jacobson's organ; jo (A) position of Jacobson's organ; l, lens; m, muscle; m.o., medulla oblongata; n, nostril; n.c., nasal cavity; n.g., nasal gland; n.p., nasal pad; o.c., cut fibres leading to olfactory membrane; ol, optic tract; ol, olfactory lobe; opl, opto lobe; pb, pineal body; pmg., premaxillary gland; t, tongue; tr, trachea; v.n., vomero-nasal nerve.

be distended and thus forms an effective valve. Closure of the nasal cavity is further effected by the glottis, which fits into the internal nares.

In the *Acrochordinae* closure of the cavity has been effected in an entirely different manner. The nostril is circular and directed more or less forwards. There is no valve anteriorly, but closure is made by a cartilaginous flap in the roof of the mouth directed backwards and covering the internal nares.

In the Sea Snakes (*Laticauda* excepted, in which the nostrils are lateral) the pad springs from the anterior margin of the nostril. It consists of dense, spongy tissue and has no external orifice. As in the *Homalopsinae* additional closure is made by the glottis.

In the vipers *Pseudocerastes* and *Eristocophis*, in which the nostril is directed mainly forwards, the pad divides it into two parts. The lower opening leads into the nasal cavity proper, the upper into a small sac or pocket which has been called the supranasal sac. This lies immediately beneath the skin of the upper part of the head, behind the nostril (fig. 155, B), and can be seen without dissection by lifting up the skin over the upper aperture. Schmidt (1930), who first discovered this sac in *Pseudocerastes*, tentatively compares it with the loreal pit of the Pit Vipers. There can be little doubt that the pad is an adaptation to desert life and that its function is to act as a valve. The supranasal sac has been isolated in the process and probably serves no special purpose. The sac described by Parker (1932)* in *Bitis* is quite different. It is an extension outwards of the anterior portion of the nasal cavity with which it is continuous.

The nasal gland can be divided into two parts, namely, an external, which lies behind the nostril and can be seen on reflecting the skin, and an internal, which lies within the nasal cavity. This inner portion is absent or vestigial in the aquatic snakes and in some others, e. g., *Dryophis*. Its secretion is discharged into the nasal cavity.

Sexual Variation.

Sexual dimorphism is not marked in snakes. Nevertheless, I believe that minute attention to detail will reveal characters that we do not know of to-day. The sexual variation in ventral and caudal count and in the carination of the dorsal scales has already been dealt with. In some genera (*Macropisthodon*, *Aspidura*, *Opisthotropis*) the dorsal scales of the male in the ischiadic region show strong, short keels or tubercles (fig. 10, D, p. 33). In *Aspidura* the shields covering the lower jaw, especially the genials, show minute sensory tubercles (fig. 106, p. 335).

* J. Linn. Soc. xxxviii. p. 213.

Sexual dichromatism is rare in snakes, and is never distinctive. A nuptial dress is unknown. Nor do the colour changes, depending upon psychological or psycho-physiological stimuli, which many lizards, particularly the Agamids and Iguanids, undergo during the breeding season, occur in snakes.

In the young the colour pattern is usually more vivid than in the adult, and in old individuals the colour pattern may be entirely, or almost entirely, lost. Those species (*Elaphe*, *Ophedrys*) which are entirely green in colour, are usually not green, but greyish or buff coloured, at birth, but further information upon this point is needed. The change in colour is due to the absence of the blue, leaving only the yellow. In *Dryophis praxinos* the colour is variable, and entirely yellow or entirely green individuals are found living side by side. In *Elaphe orycephala* the blue is absent from the tail, but not from the rest of the body. Some remarks on the evolution of colour pattern will be found under *Natrix piscator*, p. 287.

The coloration and markings of a spirit specimen will stand out more clearly when it is immersed in a bowl of water.

Eggs and Young.

The majority of snakes lay eggs. They are oval in shape, and usually about twice as long as broad. In those species that have long and slender bodies, e.g., *Ahaetulla* and *Dryocaulamus*, they may be as much as four times as long as broad. They are covered with a whitish or yellowish parchment-like skin which contains a small amount of lime. When laid, they adhere to one another by means of a sticky fluid secreted by the oviducts. Development of the embryo within the egg often begins before it is laid, in some it is well advanced before deposition. Viviparity, or the birth of living young, occurs in the Sea Snakes (*Hydrophidae*), the Freshwater Snakes (*Homalopidae*), and occasionally in other genera. Weekes (1935) has shown that true placentation can be demonstrated in some of the Australian Elapids.

Oviparity and viviparity have no taxonomic significance. Closely allied species may produce young by either means, as in the genera *Atractodes* and *Trimetopon*.

During development a considerable amount of water is absorbed by the "shell," so that there is an increase in size, particularly in girth. The number of eggs produced at one time by different species varies enormously. It ranges from three or four, to 72 (*Acrochordus javanicus*) and over 100 (*Python molurus*). Young mothers produce fewer eggs or young than those that are fully grown.

In oviparous species the embryo is provided with an egg-tooth to enable it to cut through and thereby release itself

from the shell at the time of birth. It can be seen projecting from the lower border of the rostral shield. It is usually shed within a few hours of birth. In the viviparous species it is much reduced in size and often indistinct, and may be shed even before birth.

Kopstein's recent work (1938) on the breeding habits of Javanese snakes has led to some interesting and remarkable discoveries. He found that sexual maturity is attained in some snakes much earlier than is generally believed. In *Natrix subminiata* it was reached at 13 months, in *Ptyas mucosus* at 20 months, in *Pareas carinatus* at 11 months. He also discovered that it was possible to have successive layings of fertile eggs without remating. An isolated female *Boiga multimaculata* laid four eggs on May 5th, 1934, and four more on January 1st, 1935. From all the eggs young ones hatched; after that only unfertilized eggs were laid.

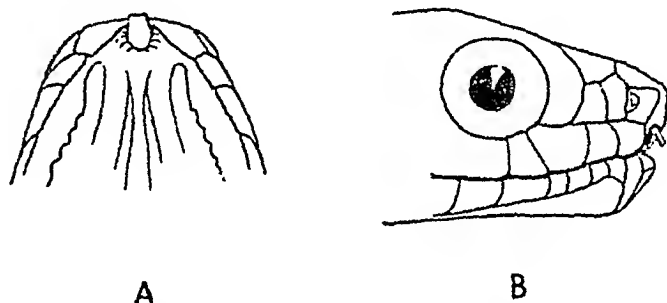


Fig. 8.—Egg-tooth of *Elaphe melanura*.
A. Seen from below. B. Seen from the side.

A female *Natrix subminiata* laid five eggs on July 9th, 1934, five on October 2nd, and five on November 15th. After that, only unfertilized eggs were laid. Recent observations by American writers (Trapido, Rahn and Haines, 1940) show that the spermatozoa can be retained alive in the uterus for several months. Gestation periods, as recorded, must therefore be accepted with reserve. Copulation is not necessarily followed immediately by ovulation.

Habits.

These, in so far as they are known, are recorded under the species or genera concerned. Much, however, remains to be done upon the subject. Of the mating and breeding habits of a large number of the species we know nothing. Wall's numerous notes upon the habits of Indian snakes have been freely drawn upon for these pages, and it is due to him,

more than to any other person, that we know as much as we do. Prater (1933) has written an interesting article, mainly upon the breeding habits of the Indian species.

Observations upon courtship and the mating behaviour of snakes must necessarily be fragmentary for the opportunities of observing them in nature can be only accidental. Davis (1936) and Noble (1937) have added to the available data, and have reviewed the whole subject. There is general agreement that the data indicate that given types of courtship behaviour are common to related groups of species " (Davis).

Rivalry and combat between the males—a common occurrence in lizards—may also occur in snakes. McCann (1935) has recorded it of the Indian *Ptyas mucronis*, and Fleay (1937) of the Australian *Hoplid, Pseudochis porphyriacus*.

The positions assumed for the two purposes are different. In fighting, as McCann states, "the snakes were entwined round one another like a twisted rope," and this posture is borne out by Fleay's photographs of the Black snake. The photograph of two *Dhamans* mating (Prater, 1933, p. 469) is more like the attitude assumed when fighting.

The majority of snakes are crepuscular or nocturnal in their wanderings. Some species of *Elaphe*, *Coluber*, *Ptyas*, and *Natrix* may be found abroad at any hour of the day when in search of food, but, as far as my own observations go, only the members of the arboreal genera *Ahaetulla* and *Dryophis* really appear to revel in the tropical sunshine. In northern latitudes in the tropics, especially at the higher altitudes and during the winter months many species come out to bask in the sun, as they do in colder climates. In the south the sun is too fierce for this practice, and, in fact, observations made in recent years upon Rattlesnakes in America (Blossauer & Lazier, Swift, Blum & Speelman, 1933), and by Fraser in India upon different species (1936), show that direct tropical sunlight, even for a short period, is fatal to them.

Zoogeography.

The problem of zoogeography is to determine the origin or centre of dispersal of species, genera, families, groups, call them what you like, and to ascertain their range or distribution throughout the world. Of the place of origin of many species and subspecies of snakes we are in no doubt. They have arisen from pre-existing species in the regions they inhabit to-day. Of the distribution of the families we are also clear, their characters are well defined, and there should be no difficulty in assigning any species to its place, but of the place of origin of the widely distributed families we have no knowledge. In dealing with genera it is quite different. Some of them can be recognised as compact groups of species,

the majority are in the process of evolution, and through intermediates can be linked up with closely related genera. Their characters, in consequence, cannot be clearly defined. For the purpose of zoological distribution, the large and comprehensive genera of Boulenger are in some respects more instructive than the smaller and less clearly defined ones that we accept to-day.

The species which inhabit the area dealt with in this volume fall into two categories :—I. The species that inhabit the Oriental Region and which form the majority of those described. II. Entrants from outside regions.

The long barrier of the Himalayas in the north and the extensive sea-boards of India and Indo-China in the south, leave only three points of entry. These are :—

1. The desert or semi-desert country of N.W. India which admits the fauna of S.W. Asia—the Irano-Turanian subregion of the Palearctic. The genera mainly concerned here are *Coluber*, *Contia*, *Lytrochynchus*, *Tarbophis*, *Psammophis*, and *Pseudocerastes*.

2. Entrants from China and Yunnan. As already stated in the general discussion on zoological areas (vol. i. p. 14), the northern limit of Indo-China is not easily defined. The determining factor is climate, and in the absence of any natural boundary an arbitrary one has to be drawn. The mixing of Chinese and Indo-Chinese faunas in consequence is more general. Four genera may be mentioned in connection with this region, namely, *Dinodon*, the Chinese representative of *Lycodon*; *Pseudoxenodon*, derived from *Natrix*, but now with more species in China than in Indo-China; *Achalinus*, mainly Chinese, and closely related to the Indo-Chinese *Fimbrios*; and the Viper *Azemiops feæ*.

3. Entrants from the Malayan Region. The southern limit of the Indo-Chinese subregion is at the Isthmus of Kra. The mountain range which forms the backbone of the Peninsula at this point divides it into two distinct areas, namely, a wet and heavily forested country on the West, and a much drier and less heavily forested one on the East. The climatic conditions on the West are Malayan, and in consequence the northward extension of species from Malaya has been much farther on this side than on the other.

The Andaman and Nicobar Islands belong to the Indo-Chinese subregion. All the evidence that we have, both geological and faunal, indicates that they are a continuation of the mountain range of the Arakan Yomas extending southwards from Cape Negrais in Lower Burma, and were at one time a part of the continental shelf that included also Sumatra, Java, Borneo, and a part of the Philippines.

No	Species	Andaman Is	Nicobar Is	Indo-gamous	Distribution outside the Andaman and Nicobar Is
1	<i>Typophloeus braminus</i>	+	+	no	Oriental Region of Indian Ocean
2	<i>Typophloeus cates</i>	+	—	yes	—
3	<i>Typophloeus andamanensis</i>	+	—	yes	—
4	<i>Xenopeltis unicolor</i>	+	—	no	Indo-China, Malaysia
5	<i>Pykodon reticulatus</i>	—	+	no	Indo-China, Malaysia
6	<i>Acrochordus granularis</i>	—	+	no	Indo-China, Malaysia
7	<i>Eliophis azygophala</i>	+	+	no	Indo-China, Malaysia
8	<i>Allophis flavolineata</i>	+	+	no	Tenasserim, Malaysia
9	<i>Ptyas mucronus</i>	+	—	no	India, Indo-China
10	<i>Liolepis nicobariensis</i>	—	+	yes	—
11	<i>Oligodon woodhousei</i>	+	+	yes	—
12	<i>Ahaetulla okinawensis</i>	+	—	yes	—
13	<i>Ahaetulla cyathophora</i>	+	+	no	Indo-China, Malaysia
14	<i>Chrysopepla ornata</i> *	+	—	no	Indo-China, Malaysia
15	<i>Lycodon aulicus</i>	+	—	no	India, Java
16 a	<i>Ninia pectorator pectorator</i>	+	+	yes	—
16 b	<i>Ninia pectorator melanogaster</i>	+	—	no	—
17	<i>Ninia maculata</i>	+	+	no	—
18	<i>Bogeia ocellata walli</i>	+	+	yes	—
19	<i>Bogeia ceylonensis</i>	+	—	no	Burma, Ceylon; India
20	<i>Cerastes rhynchops</i>	+	+	no	Indo-China, Malaysia
21	<i>Ferdinandus leucobolus</i>	—	+	no	Indo-China, Malaysia
22	<i>Cantoria molucca</i>	+	—	no	Indo-China, Malaysia
23	<i>Dungarum carolinus</i>	+	—	no	Indo-China, Malaysia
24	<i>Naja naja kaibulensis</i>	+	—	no	Indo-China, Malaysia
25	<i>Naja khamrai</i>	+	—	no	Indo-China, India
26	<i>Trimerurus cantoni</i>	+	+	yes	—
27	<i>Trimerurus purpurimaculatus cantoni</i>	+	+	yes	—
28	<i>Trimerurus albolabris</i>	+	+	no	Indo-China, Malaysia
29	<i>Trimerurus labialis</i>	+	+	yes	—

* or parvulus; not seen by me

For so small an area they are remarkably rich in the variety of their species, 6 families and 19 genera being represented. Isolation could account for the large number of indigenous forms. Of the 29 species of snakes listed, 9 are peculiar to the islands, and 2 more, namely, *Natrix piscator* and *Bungarus cæruleus*, although listed under the name of the form that inhabits India, are not quite typical and could well have been derived from an ancestor inhabiting the Indo-Chinese subregion. The status of *Boiga ceylonensis* is doubtful. That Indo-China and not Malaysia was the main source from which they received their ophidian fauna is evident from a study of the accompanying list. For a fuller account of the herpetology of these Islands see Proc. Linn. Soc. (Smith, 1941).

All the families of snakes inhabit the Oriental Region. The Typhlopidae, Leptotyphlopidae, Boidae, Colubridae, Elapidae and Crotalinae are cosmopolitan in their distribution; the Viperinae are confined to the Old World, and, as pointed out long ago by Boulenger, their distribution accords closely with that of the Lacertidae. The Uropeltidae and Xenopeltidae are peculiar to the Oriental Region; the Anilidae and Dipsadinae to-day inhabit the Oriental and Neotropical regions. The Hydrophiidae being marine, and with greater facilities for dispersal, cannot be judged like the land snakes. They range from S.E. Asia to Australia and Polynesia, but the majority inhabit the Oriental seas. Of the 16 genera recognized to-day, 13 are found in Oriental waters. The Dasypeltidae, confined to two genera and three species, are highly specialized for their particular mode of life. They inhabit Africa and Northern Bengal.

The foregoing remarks on the families will suffice also for their genera, except for the Colubridae. The natural groups into which this family can be arranged and their relationships with other genera throughout the World are discussed with the Key to the Colubrinae on p. 138.

Three other points in connection with zoogeography deserve mention.

1. The families, subfamilies, and genera which occur in the Oriental and Neotropical Regions, but are absent from other parts of the World. These are the Anilidae, Dipsadinae, and Xenoderminae, and the genera *Trimeresurus* and *Sibynophis*. A close parallel to this distribution is to be found in the Microhylidae (Amphibia) but is not known in the Testudines or in the Sauria.

2. Five species inhabit Indo-China and the large islands of Malaysia—Borneo, Sumatra and Java—but are absent from the Malay Peninsula and Peninsular Siam. They are *Python molurus*, *Ptyas mucosus*, *Boiga multimaculata*, *Vipera*

ruscelli, and *Trimeresurus albolabris*. Two genera, namely *Stoliczkaia* and *Ophiotropis*, carry this discontinuity in distribution even further north, being absent from the southern half of Indo China. Many theories to account for this peculiar distribution have been put forward. They are concerned chiefly with the elevation and subsidence of land masses in that part of the world. Chasen (1935) recognizes two lines of dispersal from the mainland of Asia, one through the Peninsula the other through Borneo from Indo-China.

3 In my volume on Lizards (p. 15) I commented on the affinities of the fauna of the Malayan Region with Ceylon and Southern India. Only one genus of snakes, namely *Cylindrophis*, has this distribution, being found in Malaysia, Indo China, and Ceylon, but not in Peninsular India.

Evolution and Classification

Any sketch which deals with the evolution of the snakes and endeavours to trace their development from the primitive or generalized forms to the more advanced ones must take into consideration certain fundamental changes in structure. The changes do not concern species, or genera, or even families, but may be regarded as trends in evolution which affect the whole suborder.

1. The ability of most snakes to swallow food much exceeding their own calibre is well known. This is possible because the bones of the skull concerned with deglutition are loosely attached to the cranium and freely movable on it. Setting aside the degenerate, and yet in some ways highly specialized, families of Typhlopidae, Leptotyphlopidae, and Uropeltidae, we find that in the most generalized families the bones of the skull are more or less solidly united, the supratemporal is intercalated in the cranial wall and the quadrate, which articulates with it, is short and vertically placed. In the more advanced families this rigidity has been overcome. The maxilla has been freed from the premaxilla, the prefrontals from the nasals, and in consequence the palato-maxillary arch is capable of considerable rotation outwards and forwards, each arch also can move independently of the other. The loosening and lengthening of the supratemporal, and the lengthening of the quadrate, an increase which is provided for by its extension backwards, has increased enormously the capacity of the jaw opening. This type of skull architecture is to be found in all the Colubridae and higher families. *Python*, as representing the most complete ophidian skull known, is here shown in greater detail than any of the others figured (see fig. 32, p. 104).

2. The evolutionary changes in the teeth are well known. They have resulted in specialization in structure, in the conversion of the solid-toothed (aglyphous) and uniform dentition of the primitive families, still persisting in many of the Colubridæ, to the grooved posterior teeth of the Opisthoglypha and the canaliculate fangs of the Elapidæ (Proteroglypha) and Viperidæ (Solenoglypha). The Oriental Colubridæ can be sharply divided into aglyphous and opisthoglyphous forms, and, as a ready method of identification, this character is invaluable. With some of the American genera this is not possible, transitional stages being present or absent in the same genus, sometimes even in the same species. As a means of expressing stages in evolution the terms Aglypha and Opisthoglypha are useful and convenient, and in that sense they are used in this volume. They have no taxonomic value. Thus, the nearest relative of the opisthoglyphous *Balanophis* is the aglyphous *Natrix*, of the opisthoglyphous *Chrysopelea*, the aglyphous *Ahetulla*.

Step by step with the specialization of the teeth, but not always keeping in step with it, has gone specialization of the supralabial gland. Its evolution into a venom gland is sketched in fig. 5. In *Xenopeltis unicolor* it is a long strip of undifferentiated glandular tissue extending the whole length of the upper lip. In *Ptyas mucosus* a portion of the posterior part of the gland has become specialized, and can be distinguished, in preserved material, as a yellowish patch (outlined in the figure). Already in some of the opisthoglyphous Colubridæ its secretion when injected into them is toxic enough to kill small vertebrates. In *Cerberus rhynchops* the gland is early differentiated, both in colour and external lobulation, from the supralabial, and can, by dissection, be more or less completely separated from it.

In all the Opisthoglypha this gland is distinct from the supralabial; its secretion is strongly toxic to small vertebrates and many of them kill their prey by its means. The later stages in the evolution of the gland and its final development into the highly specialized organ of the Proteroglypha (Elapidæ) and Solenoglypha (Viperidæ) can only be conjectured. The origin of the Viperine fang through opisthoglyphous genera has been constructed by Boulenger (1896 and 1917. See also E. G. Boulenger, 1915 and Haas, 1938); of the origin of the Elapine fang we have no such indications. Boulenger's suggestion (1896) that it may have been derived from a snake with the *Boædon* type of dentition, in which some of the anterior teeth are enlarged and fang-like, is difficult to reconcile with our present knowledge of the evolution of the venom gland from the posterior part of the

supralabial. The separate origins of the viperine and Elapine fangs which is suggested by their dentition is shown also in the different physiological constitution and the action of the venom. Kellaway (1933) has pointed out however, that the Australian Flapjacks may have the properties of both types.

3. The changes in the vertebral column concern the hypapophyses of the dorsal vertebrae and the muscular structures connected with them. The character was first employed by Cope and later by Boulenger who according to their presence or absence on the posterior dorsal vertebrae arranged the genera of the Colubrinae in two series (Cat. Sn. I. p. 170). Some later authors have carried this grouping farther and regard them as subfamilies the *Natricinae*—with processes—and the *Coroninae*—without them.

Hæmal processes or hypapophyses are absent except quite anteriorly in the dorsal vertebrae of all primitive snakes as high as and including most of the Boidæ. In some they are present in a few cervical vertebrae only in others they extend as far as the anterior one third of the body. Hæmal processes, possibly homologous with the dorsal are also present on the caudal vertebrae. They are usually paired and their musculature is quite different. A similar condition is to be found in most of the families of the Sauria. Hypapophyses are present throughout the vertebral column in all the poisonous snakes (Elapide, Hydrophuide, Viperide). They vary in their degree of development being stronger in the Viperide than in the Elapide.

Between these two groups lies the great family of the Colubridæ in which they may be present or absent. The recent discovery of Brongersma (1938) that in the same genus, namely *Chrysopela* and possibly also in other genera the processes may be present or absent has upset our hopes that this character could be used to divide the Colubridæ into two distinct branches. But because it fails in some genera there is no reason to abandon its use entirely. Like the aglyphous and opisthoglyphous character of the teeth it indicates stages in evolution, but not necessarily phylogenetic relationship. As a character for the easy recognition of certain groups it is most valuable.

The arrangement of the families is given on page 39. The majority of them are well defined and it is unlikely that further work will alter our definition of them. The difficulty has always been and still is with the Colubridæ. This huge family, whose members constitute some two thirds of all the known species of snakes cannot be divided further than genera except by the elimination of a few small subfamilies. Certain

natural groups are evident, and these are listed after the Key to the Colubridæ on pp. 138-9. Many of the inclusions are tentative, and later authors will no doubt supplement and modify the arrangement given here.

Preservation and Examination of Specimens.

For the preservation of snakes for Museum purposes, alcohol should be used whenever possible. Formalin, which is now so often employed on account of its greater convenience

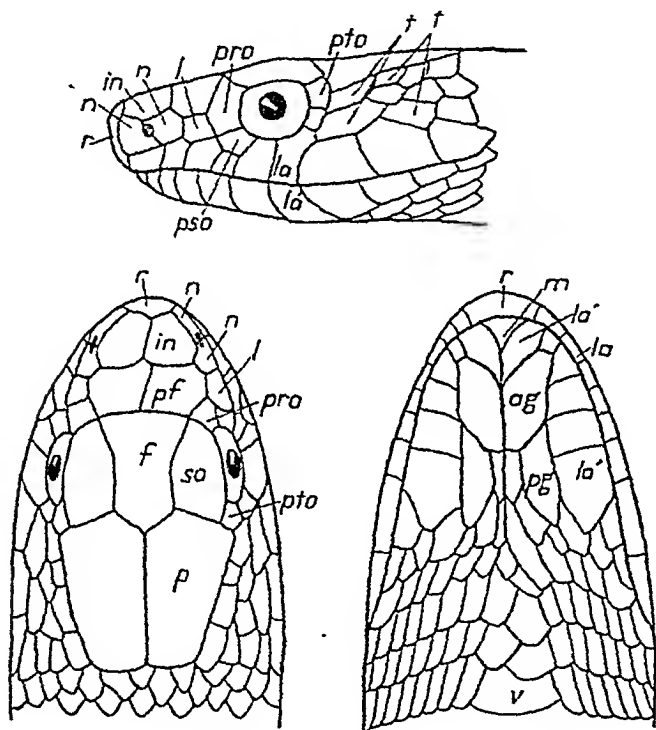


Fig. 9.—Three views of the head of *Coluber ventromaculatus* to explain the terminology of the head shields.

ag., anterior genials (or chin shields); f., frontal; in., internasal; l., loreal; la., supralabial; la', infralabial; m., mental (or symphysial); n., nasal; p., parietal; pf., prefrontal; pg., posterior genials (or chin shields); pro., preocular; pso., presubocular; po., postocular; r., rostral; so., supracocular; t., anterior and posterior temporals; v., first ventral.

has many disadvantages. Its chief one is its effect upon certain colours, in particular the greens, which become blackish, and in time quite black. It tends also to "flatten out" the

blacks browns and whites so that their contrasts are diminished. The reds on the other hand are preserved but only as long as the specimen remains in formalin. Specimens placed in strong formalin harden rapidly and ultimately become brittle.

Ordinary methylated spirit which can be bought from any pharmacist will do. This is usually 95 per cent alcohol and for use must be diluted with 1 part of water to 3 of spirit. The blue or red dye which is used to colour it will not affect the specimen nor will the turbidity which is sometimes produced when water is added. It is most important that the preservative should penetrate into the body cavity as rapidly as possible. In fact it can be laid down as an axiom that the excellence of a specimen depends upon its proper fixation in the first 24 hours. Some collectors inject their preservative with a hypodermic syringe. I believe better results are obtained by making a series of small incisions along the middle of the belly or at the outer margins of the ventrals. It is particularly important where the hinder gut lies the digested food causing putrefaction very rapidly. Incisions at this part therefore should enter the gut and not merely the abdominal cavity. The same spirit cannot be used indefinitely. Every specimen added will reduce its alcoholic strength and fresh (95 per cent) spirit must be added as required. If the strength is correct the specimen will become distinctly harder and more rigid within 24 hours and will continue to stiffen for several days. To overcome this rigidity I have used manipulation of the specimen for a few minutes twice daily for the first three or four days of preservation. The results were excellent the specimen remaining permanently flexible like a freshly killed one.

Commercial formalin the concentrated form which the collector would carry with him is a solution containing approximately 40 per cent of formaldehyde and this figure frequently gives rise to some confusion. It is usual to refer to a 3 to 5 per cent solution of formalin as the correct one for preservation and these percentages refer to the commercial solution. A 5 per cent solution of formalin only contains 2 per cent formaldehyde and a solution containing 5 per cent formaldehyde would be 12.5 per cent formalin far too strong for normal preservation. Formalin on keeping is apt to decompose with production of free acid which is injurious to the specimen. To counteract this borax or chalk should be added to neutralize the acid as it forms.*

* These remarks on formalin are taken from *Instructions for Collectors No 3 Reptiles Amphibians and Fishes* 5th Edition, British Museum (Natural History).

There are many ways of killing a snake, and it need hardly be said that the less the specimen is damaged, the better. The simplest way, and a very effective one, is to break the spine a short distance behind the head by a blow with a stick. One blow should be sufficient; the body will continue to give convulsive movements for some time afterwards, but for all practical purposes the snake is dead. Small snakes, and many lizards and amphibians, are extremely susceptible to nicotine, and a few drops of it placed in the mouth will kill them almost instantaneously. A small bottle of nicotine for this purpose can be obtained from most pharmacists. Large snakes—over 8 or 10 feet in length—are too bulky to be preserved in the ordinary way. They must be skinned by cutting along the whole length of the belly, leaving the head, and if possible the tail, untouched. The skin can then be preserved in spirit in the ordinary way. Dried skins are not satisfactory for Museum purposes.

I have gone at considerable length into the question of the preservation of specimens, for it is one on which many collectors take little trouble. It is obvious that the better the specimen is preserved, the more complete can any examination of it be made afterwards.

Living colours should be noted. The reds and yellows usually fade rapidly in spirit; the browns and blacks remain. It is important to have the exact locality where a specimen was collected. If the place or village is not likely to be found on the map, its position with regard to the nearest town of note, or its position in Longitude and Latitude, should be given. Labels written in pencil will last well if they do not get chafed.

Descriptive Methods, etc.

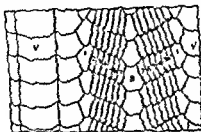
The descriptions are based on the material examined. They include the common variations, but not the unusual ones, which are regarded as aberrations. The ventral counts, as recorded by different authors, vary so greatly, that I have relied mainly on those specimens I have seen myself. A count which has been found or has been recorded as being well outside the normal variation, is placed in brackets beside what is regarded as the normal. When examining juveniles it is well to remember that in them the eye and the frontal shield are relatively larger than in the adult.

As regards the synonyms and references for genera and species, etc., this volume follows closely the procedure adopted for the two previous ones. For convenience they are repeated here.

The references given are not intended to be in any way complete. They have been chosen in so far as they are relevant

to the text and to enable the reader to know where to look for further information.

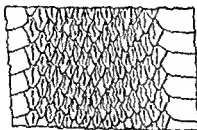
A scientific name in the synonymy when followed by an author's name without an intervening comma and the date,



A



B



C

Fig. 10 (A-C) —Scaling of the body of: A. *Aetideus aetideus* showing enlarged vertebral scales (B) the apical pits on the oblique dorsal scales, and the lateral keel of the ventral shields (v). B. *Elopheichthys* radiata, showing normal scales. C. *Pseudomugil macrocephalus*, showing oblique scales.



D

Fig. 10(D).—Ischiadic region of ♂ of *P. macrops*, showing knobbed keels

refers to the first published mention of that name. In the case of a species the type-locality follows, and, if it is known, the name of the town in which the type is kept. A name followed by a comma and then the author's name indicates a reference subsequent to the original description. Boulenger, F. B. I., 1890, refers to his volume of that date.

The list of common characters which follows the generic characters permits the descriptions of the species to be curtailed considerably. The generic characters cover the whole genus; the common characters apply only to the species described in this volume.

The International Rules of Zoological Nomenclature have been followed as far as their interpretation permits. It should be noted that Rule 19 was amended at the International Congress at Padua in 1930 in order to make the English version conform with the official French text *, and now reads as follows :—"The original orthography of a name is to be preserved unless an error of transcription (transliteration), a *lapsus calami*, or a typographical error is evident." The spellings of some disputed words therefore have been retained in accordance with classical procedure, e.g. *Ancistrodon* instead of *Agkistrodon*, *Aepyurus* instead of *Aipysurus*.

* Arch. Zool. Italiano, xvi, 1932, pp. 90, 91.

Trinomials are restricted to those varieties, races or sub-species that have well-defined characters, a restricted geographical range and little or no intergradation with other races. Colour varieties that intergrade completely with others are listed in serial order. The typical pattern is described and the names proposed for it by other authors are included.

English names are given only to those species that are common and widely distributed. To attach a name to every

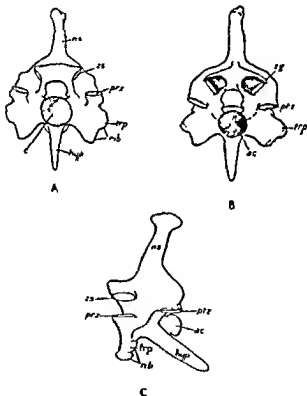


Fig 11—A. Anterior B Posterior and C Lateral view of anterior dorsal vertebra of *Python reticulatus*

ac articular surface for centrum c centrum; hyp., hypapophysis;
 ns neural spine prs presygapophysis prs., postsygapophysis
 rib faceta for rib; trp., transverse process sq., sygantrum
 zs zygosphene

species, many of which are known only from a few specimens. is superfluous. For that reason I have not adopted all the names proposed by Wall. Some, owing to changes in nomenclature, are now inappropriate. The use of the name *Coluber*, for instance, when the genus which he calls *Coluber* is now known as *Elaphe*, would only cause confusion. In adopting the name *Racers* for the genera *Coluber* and *Elaphe*, I have taken one that has long been used in America for the same group.

The nomenclature of the head shields and the method of counting the dorsal scales are shown on the accompanying figures.

Unless otherwise stated in this volume, the upper head shields are understood to be normal, viz., to consist of a rostral, a pair of internasals, a pair of prefrontals, a frontal, a pair of supraoculars and a pair of parietals; on each side one or two nasals, a loreal, one or more pre- and postoculars, temporals and several labials.

The measurements given for the species are of the largest that I have examined, or of which there is an authentic record.

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Order SQUAMATA.

Suborder SERPENTES.

Serpentes Linnaeus, 1758, Syst. Nat. 10th ed. i, p. 214; Pope, Snakes Alive, 1937 (habits).

Ophidia Macartney, 1802, in Ross. Transl. Cuvier's Lect. Comp. Anat. i, tab. iii; Boulenger, F. B. I. 1890, p. 232, and Cat. Sn. Brit. Mus. i, 1893, p. 1; Gadow, Amphib. and Rept. 1909, p. 581; Nopsca, Palæobiologica, i, 1928, p. 178; Romer, Vertebrate Paleontology, 1933, p. 439; Hoffstetter, Arch. Mus. Hist. Nat. Lyon, xv, 1939, p. 3.

Key to the Families.

- I. Palato-maxillary arch* incomplete,
no ectopterygoid; no supratemporal;
prefrontal forming a suture with the
nasal; coronoid present; vestiges
of pelvis.

Maxilla transversely placed, loosely attached,
toothed; mandible edentulous Typhlopidae, p. 41.

Maxilla bordering the mouth, toothless;
mandible toothed Leptotyphlopidae, p. 59.

- II. Palato-maxillary arch complete*;
both jaws toothed.

- A. Coronoid present; prefrontal bone
in contact with the nasal.

1. Vestiges of hind-limbs; supra-
temporal present.

Bones of the skull united to one another;
supratemporal intercalated in the cran-
ial wall Aniliidae, p. 94.

Supratemporal attached scale-like to the
cranium, entirely suspending the quad-
rate; facial bones movable Boidae, p. 102.

2. No vestiges of limbs; no supra-
temporal; tail very short, blunt,
the scales covering it more or
less modified Uropeltidae, p. 61.

- B. No coronoid bone.

1. No poison fangs in the front of the
jaw.

Bones of the skull solidly united; pre-
maxillary teeth; prefrontal bone in
contact with the nasal Xenopeltidae, p. 98.

No premaxillary teeth; prefrontal not in
contact with the nasal; facial bones
movable Colubridae, p. 114.

* The palato-maxillary arch is composed of four bones, namely the palatine, pterygoid, maxilla, and ectopterygoid.

Maxillary bone edentulous except for a few minute teeth, hypapophyses of the anterior vertebrae piercing the oesophagus

Dasypeltidae, p 403

- 2 Poison fangs in the front of the mouth the most anterior maxillary tooth canaliculate or tubular

Maxillary bone horizontal, with teeth behind the poison fangs, tail cylindrical, no broad shield

Elapidae, p 406

Maxillary bone horizontal, with teeth behind the poison fangs, tail vertically compressed paddle-shaped

Hydrophiidae, p 439

Maxillary bone very short vertically erectile, no teeth on it except the poison fangs

Viperidae, p 477

As an alternative Key based upon characters that are easily determined and mostly external, the following is proposed, except for some members of the Colubridae, it will be found to work very well

- I Eyes vestigial covered over by shields
body worm like, covered with uniform scales, tail very short

Teeth only in the upper jaw, 16 to 36 scales round the body

Typhlopidae

Teeth only in the lower jaw, 14 scales round the body

Leptotyphlopidae

- II Eyes exposed; teeth in both jaws, median row of ventral scales more or less distinctly enlarged usually forming transverse shields

- A Vestiges of hind limbs, terminating in a claw like spur, usually distinguishable on each side of the vent, ventral scales transversely enlarged, not extending completely across the belly

Ventrals scarcely broader than the adjacent scales 19 to 23 scales round the body

Aniliidae

Ventrals narrow, but quite distinct, more than 40 scales round the body

Boidae

- B No vestiges of limbs

- 1 No poison fangs in the front of the mouth.

Premaxillary teeth, an atygous occipital shield, in contact with the frontal, ventrals well developed, not extending completely across the belly

Xenopeltidae

Ventrals scarcely broader than the adjacent scales, tail extremely short, ending obtusely and covered with modified scales

Uropeltidae

Ventrals nearly or quite as broad as the body, tail cylindrical, pointed, no premaxillary teeth

Colubridae

Maxillary bone edentulous except for a few minute teeth, scales in 15 rows, pupil vertical

Dasypeltidae

2. Poison fangs in the front of the mouth, the most anterior maxillary tooth canaliculate or tubular.
- Maxillary bone with teeth behind the fangs ; tail cylindrical ; no loreal ; pupil round ; ventrals nearly or quite as broad as the body Elapidæ.
- Maxillary bone with teeth behind the fangs ; tail vertically compressed, paddle-shaped ; pupil round Hydrophlidæ.
- Maxillary bone very short, bearing fangs only ; pupil vertical ; ventrals nearly or quite as broad as the body Viperidæ.

Family TYPHLOPIDÆ.

Typhlopsidæ Gray, 1845, Cat. Liz. Brit. Mus. p. 130 (in part).
Typhlopidae, Boulenger, F. B. I. 1890, p. 234, and Cat. Sn. Brit. Mus. i, 1893, p. 3 ; Werner, Arch. Naturg. Berlin, lxxxvii, 1921, p. 266 ; Essex, P. Z. S. 1928, p. 879 ; Haas, Zool. Jahrb. lli, 1930, p. 1, and Zeit. Zell. mik. Anat. Berlin, xvi, 1932, p. 745 ; Mookerjee & Das, Nature, cxxx, 1932, p. 629.

Palato-maxillary arch incomplete, no ectopterygoid ; maxilla more or less transverse, loosely attached to the skull, the teeth

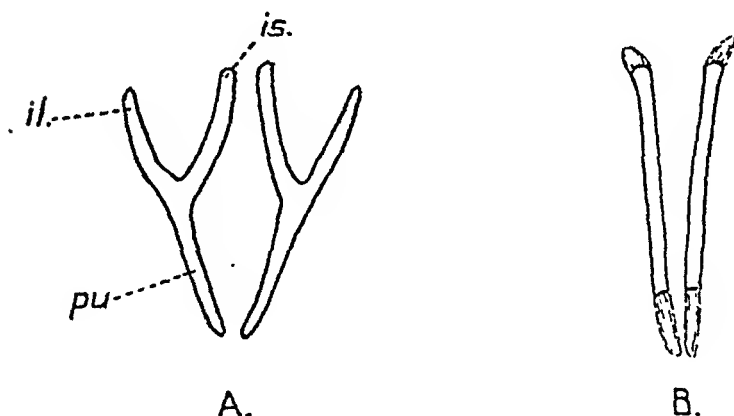


Fig. 12.—Pelvic girdles of *Typhlops*. A. *T. braminus*. B. *T. acutus* (after Essex, P. Z. S. 1927, figs. 83 & 75).

il., ileum ; is., ischium ; pu., pubis.

directed backwards ; prefrontal forming a suture with the nasal ; no supratemporal ; mandible with coronoid bone, toothless ; quadrate elongate, directed horizontally forwards. Pelvis reduced to a single bone or absent. Body cylindrical, of equal diameter throughout, covered with uniform scales ; eyes more or less distinct, under the shields.

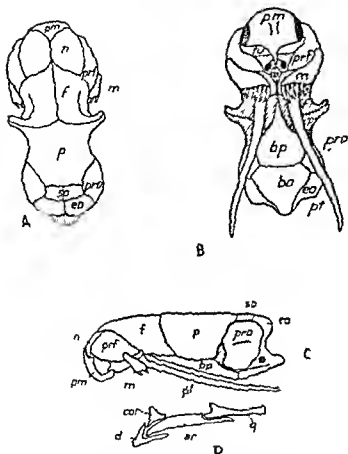


Fig 13.—Skull of *Typhlops diardi*. Drawn from a specimen stained with alizarin and a dried skull. (B.M. Collection.) \times about 20
A Dorsal, B Ventral, C Lateral views. The mandibles have been removed. D The outer view of left mandible

ar articular ba., basioccipital bp., basiphenoid; cor., coronoid
d., dentary; eo., exoccipital f., frontal; m., maxilla; n., nasal
p parietal pl., ptilotus and pterygoid, no suture visible,
pm., premaxilla, prf., prefrontal, pro., prootic, pt., pterygoid,
q quadrate so supraccipital, tu., turbinal (or septomaxilla).
v., vomer

Three genera are recognized, *Typhlops* containing by far the largest number of species.

Range. South Europe ; South Asia ; Africa ; Australia ; Tropical America.

Genus TYPHLOPS.

WORM-SNAKES ; BLIND SNAKES.

- Typhlops* Oppel, 1811, Ord. Rept. p. 54 (type *lumbricalis*) ; Boulenger, F. B. I. 1890, p. 235, and Cat. Sn. Brit. Mus. i, 1893, p. 7 ; Werner, Arch. Naturg. Berlin, lxxxvii, 1921, p. 271 ; Wall, Sn. Ceylon, 1921, p. 5 ; Mahendra, Proc. Ind. Acad. Sci. iii, 1936, p. 128.
- Typhlina* Wagler, 1830, Syst. Amphib. p. 196 (type *lineata*).
- Pilidion* Dum. & Bibr., 1844, Erp. Gen. vi, p. 257 (subst. name for *Typhlina*, same type).
- Typhlinalis* Gray, 1845, Cat. Liz. Brit. Mus. p. 134 (subst. name for *Typhlina*, same type).
- Argyrophis* Gray, l. c. s. p. 136 (type *bicolor*).
- Diaphorotyphlops* Jan, 1861, Arch. Zool. Anat. Fisiol. i, (2) p. 185 (type *disparalis*).
- Gerrhopilus* Fitzinger, 1843, Syst. Rept. p. 24 (type *ater*).
- Aspidorhynchus* Fitzinger, l. c. s. p. 24 (type *cschrichtii*).
- Gryptotyphlops* Peters, 1881, Sitz. Ges. Nat. Fr. p. 70 (type *acutus*).

Head not distinct from neck, with large rostral, nasal, ocular and preocular shields ; nasal shield more or less completely divided into an anterior and lower, and a posterior and upper portion, the cleft passing through the nostril ; the lower cleft is always present, the upper may or may not be ; mouth small, inferior ; tail extremely short. Four supralabials is constant for all the species.

The hemipenis of *Typhlops diardi*, the only species I have been able to examine, is short and fat, with convoluted plicæ ; there are no spines.

Range : As in the Family. Werner in his revision of the genus lists 164 species.

Small, degenerate, worm-like snakes, most of them only a few inches in length, living underground, or in decaying wood or vegetation. In soft earth they can burrow rapidly, but the highly polished character of the scales, all of which are very strongly imbricate, and the absence of ventral shields makes progression above ground often difficult. Use, however, is made of the terminal spine of the tail with which most of the species are provided. This, being stuck into the ground and thus fixing the body, is used as a lever for moving the body backwards or forwards. According to Annandale the hook on the snout of *acutus* is used for the same purpose. Their food consists of worms, soft-bodied insects and their larvæ.

It is usually stated that the Typhlopidae are oviparous,

but Wall has remarked (1918) "I am not aware of any authenticated instance of the eggs of any of them having been deposited. Certainly not all the species are oviparous. A very large specimen of *T. dardi* (B.M. 1037.9.8.1) obtained by me near Saigon contains 14 embryos all perfectly developed. The usual number of eggs (or young) produced at a time is from 3 to 8.

Nothing is known about the rate of growth of the young and observations on this point would be valuable. Full length appears to be reached fairly rapidly, for it is common to find two individuals of the same species of equal length but one of them only half as thick as the other. A more puzzling problem is to account for two individuals one of which is distinctly longer but yet more slender than the other. A count of the number of transverse scale rows is then valuable for within limits this appears to be fairly constant for the species.

Mookerjee & Das (1932) and Mahendra (1936) have pointed out that the parietal bone of *Typhlops braminus* is paired, instead of the two halves being united as is usual in snakes. This is true of many of the diminutive (or most degenerate) forms of *Typhlops* and of the larger ones in early life. The character can be seen quite easily after simple dissection with a good lens but it does not alter our conception of the Ophidian skull. Degeneration of structure, in certain ways only failure of development and *Typhlops*, in respect of its parietal bones may be regarded as remaining undeveloped throughout life.

Haas (1932) has given an account of the peculiar gland like structures in the epidermis of the head of *Typhlops braminus*. He regards them as being of the type of the sebaceous glands and suggests some theories with regard to their function. A fuller investigation of these remarkable structures would well repay the work.

They are not confined to *T. braminus* and can be seen with a good lens, without dissection, in most of the Indian species, showing through the scales as light lines of transversely arranged markings following the contours of the scales but within their overlapping edges (fig. 14). In *T. beddomi*, the whole of the head anterior to the eyes is studded with them. They are least distinct in those species with a large rostral shield. *T. dardi* has a pair of conspicuous glandular patches immediately beneath the nostrils; they can be readily examined by removing the scales that cover them and the laminated arrangement of the glandular structures is then well seen (fig. 15). This condition presumably foreshadows the external pit or depression, which is to be found in *T. bothriophthalmus*.

Key to the Species.

I. Snout rounded ; nostrils lateral.

A. No subocular, the ocular in contact with the 3rd and 4th labials.

a. Nasals not in contact with one another behind the rostral.

18 scales round the body.

Breadth of rostral $\frac{1}{4}$ to $\frac{1}{2}$ that of the head ; diameter of body 50-60 times in the total length *porrectus*, p. 46.

Breadth of rostral $\frac{2}{3}$ that of the head ; diameter of body 85 times in the total length *floweri*, p. 46.

20 scales round the body.

Breadth of rostral $\frac{1}{4}$ to $\frac{1}{2}$ that of the head ; nasal suture usually passing to preocular ; diameter of body 30-45 times in total length ; 290-320 transverse scale-rows *braminus*, p. 46.

As in *braminus*, but diameter of body 55-75 times in total length ; 370-400 transverse scale-rows. *psammeces*, p. 48.

Breadth of rostral $\frac{1}{4}$ to $\frac{1}{2}$ that of the head ; nasal suture to 2nd labial ; head and neck white... *albiceps*, p. 48.

Rostral at least half as broad as the head ; eye not distinct *thurstoni*, p. 49.

22 scales round the body.

Breadth of rostral $\frac{1}{4}$ to $\frac{1}{2}$ that of the head ; nasal completely divided *jerdoni*, p. 50.

Breadth of rostral $\frac{1}{2}$ that of the head ; nasal completely divided *leucomelas*, p. 50.

Rostral $\frac{1}{4}$ as broad as the head ; nasal incompletely divided *temnicollis*, p. 50.

24 or 26 scales round the body (rarely 22 in *diardi*).

Breadth of rostral $\frac{1}{2}$ or more, that of head ; black above, whitish below *diardi*, p. 51.

Breadth of rostral $\frac{1}{2}$ that of head : back with longitudinal black lines *oatesi*, p. 53.
A pair of pits under the snout *bothriorhynchus*, [p. 53.]

b. Nasals in contact with one another behind the rostral ; 16 or 18 scales round the body.

18 scales round the body ; preocular in contact with the anterior nasal *tindalli*, p. 53.

18 scales round the body ; preocular separated from the anterior nasal *beddomei*, p. 54.

16 scales round the body *oligolepis*, p. 55.

B. 1 or 2 suboculars ; 18 scales round the body.

One subocular, separating the ocular and preocular from the labials ; rostral separating the nasals. *mirus*, p. 55.

One subocular, separating the ocular and preocular from the labials ; nasals in contact with one another behind the rostral *ceylonicus*, p. 55.
Two shields separating the ocular and preocular from the labials [p. 56.]

II. Snout pointed, with sharp horizontal edge and inferior nostrils ; 28-36 scales round the body *acutus*, p. 56.

1 *Typhlops porrectus*

- Typhlops porrectus* Stoliczka 1871 J A S Bengal xl, p 426 pl. xxv figs 1-4 (Bengal type lost) Boulenger F B 1 1890 p 240 and Cat Sn Br t Mus 1893 p 19; Blanford 2nd Yark. Mus Rept 1878 p 21 Wall, J Bombay N H S xxi 1911 p 278 fig head and b 1 xx x 1913 p 348
Typhlops mackinnoni Wall 1910 J Bombay N H S xix, p 805 fig (Mussorie 6000 ft W H Malayas London) and ibid. xxix, 1923 p 348
Typhlops cunning Wall, 1913 J Bombay N H S xx, p 515, fig (Pyawbwe Upper Burma London) and ibid xxix, 1923 p 348

Snout rounded strongly projecting nostrils lateral. Breadth of rostral $\frac{1}{2}$ to $\frac{3}{4}$ that of the head not extending quite to the level of the eyes nasal incompletely divided the suture passing from the 2nd labial to the nostril or just beyond ocular and preocular shorter than the posterior nasal eye fairly distinct in the ocular or at its junction with the supraocular lower edge of ocular wedged in between the 3rd and 4th labials, prefrontal in contact with the rostral tail ending in a fine point 18 scales round the body the diameter of which is contained 50-60 times in the total length 400-440 rows of transverse scales

Blackish or brown above paler below snout chin and anal region usually whitish

Total length 285 mm.

Range India (Kachhi N W F P the Himalayas Punjab United Prov Bihar and Orissa Bengal Bombay Dist Bangalore Travancore) Ceylon (Punduloya) Upper Burma (Pyawbwe)

2 *Typhlops floweri*

- Typhlops floweri* Boulenger 1899 in Flower F Z S p 654 pl xxxvii, fig 2 (Siam London) Cochran, Proc U S Nat Mus lxxvii, 1930 p 21

Differs from *porrectus* as follows —Nasal completely divided rostral a little broader $\frac{3}{4}$ the width of the head tail not ending in a spine Diameter of the body 85 times in the total length

Black, paler below snout and anal region yellowish

Total length 210 mm

The exact locality of the type is not known Cochran records a second specimen obtained in Bangkok

3 *Typhlops braminus*

COMMON BLIND SNAKE BRAHMINY BLIND SNAKE

- Russell 1796 Ind. Serp x, p 48 pl xliii (Vizagapatam)
 Eryx braminus Daudin, 1803, Hist Nat Rept vii, p 279 (based on Russell) —*Typhlops braminus* Cuvier Reg Anim. 2nd ed.

- ii, 1829, p. 73; Boulenger, F. B. I. 1890, p. 236, fig. head, and Cat. Sn. Brit. Mus. i, 1893, p. 16; Laidlaw, Fauna Mald. Lacc. 1902, p. 121; Annandale, Rec. Ind. Mus. i, 1907, p. 397; Wall, J. Bombay N. H. S. xviii, 1907, p. 104, and *ibid.* xix, 1909, p. 609, and xxv, 1918, p. 377, col. pl., and *ibid.* xxix, 1923, p. 349, and Sn. Ceylon, 1921, p. 9, fig. head; Pope, Rept. China, 1935, p. 71; Bourret, Serp. Indo-Chine, 1936, p. 10, fig. head; Fraser, J. Bombay N. H. S. xxxix, 1937, p. 464; Prater, *ibid.* xxx, 1924, p. 165.
- Tortrix russelli* Merrem, 1820, Syst. Amph. p. 84 (based on Russell).—*Typhlops russelli*, Schlegel, Abbild. Amphib. 1839, p. 39 (Bengal Paris).
- Ophthalmidium tenue* Hallowell, 1860, Proc. Acad. Philad. p. 497 (Hongkong; 1 type lost).
- Typhlops limbricki* Annandale, 1906, Mem. A. S. Bengal, i, p. 193 (Ramnad, S. India; Calcutta); Wall, J. Bombay N. H. S. xxix, 1923, p. 349.
- Typhlops braminus* var. *pallidus* Wall, 1909, J. Bombay N. H. S. xix, p. 609 (Dibrugarh, Upper Assam).
- Typhlops fletcheri* Wall, 1919, *ibid.* xxvi, p. 556 (Nilgiris), and Spol. Zeyl. xii, 1922, p. 253.
- Typhlops braminus* var. *arenicola* Annandale, 1906, Mem. Asiat. Soc. Bengal, i, p. 192 (Ramnad, S. India; London and Calcutta).

Snout rounded, strongly projecting; nostrils lateral. Upper portion of rostral $\frac{1}{3}$ to $\frac{1}{4}$ the breadth of the head, not extending to the level of the eyes; nasal shield completely

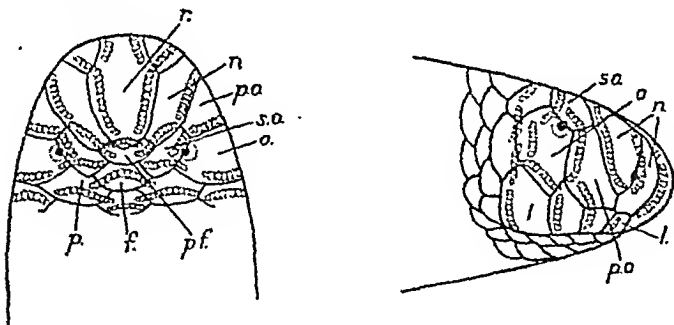


Fig. 14.—Head of *Typhlops braminus*. The disposition of the gland is also shown.

f., frontal; l., labial; n., nasal; o., ocular; p., parietal; pf., prefrontal; po., preocular; r., rostral; so., supraocular.

divided, the lower suture usually passing to the preocular, that shield being in contact with the anterior nasal; ocular and preocular subequal in breadth, both a little shorter than the posterior nasal; eye distinct, in the ocular shield or at its junction with the supraocular; lower edge of ocular shield wedged in between 3rd and 4th labials; prefrontal in contact with the rostral; tail ending in a fine point; 20 scales round the body, the diameter of which is 30–45 times in the total length; 290–320 transverse rows of scales.

Brown or blackish above, lighter below, snout anal region and end of tail usually whitish

Total length 170 mm

Range The whole of India Ceylon and Indo China Hainan southern China the Malay Peninsula and East Indian Is Persia and Arabia Africa (Zanzibar Cape Colony) the Andamans and Nicobars and Islands of the Indian Ocean Mexico

The common *Typhlops* of the Oriental Region

Variation Occasionally the nasal suture instead of passing backwards to the preocular passes downwards to the 2nd labial This has happened in the types of *arenicola diversiceps limbricki* and *fletcheri* In 12 specimens from the Tinnevely Hills (B M 84581726) it occurs in 5 while in the other 7 the usual condition obtains

Anandale's *arenicola* based on three specimens are pale buff in colour almost pigmentless in life They were found in sandy desert country and it would be interesting to know if their environment is responsible for their lack of colour

4 *Typhlops psammeces*

Typhlops tenuis Günther 1864 Rept Brit Ind. p 178 pl xvi, fig C (Madras London)

Typhlops psammeces Günther L c s p 444 (subst name for *tenuis* proco)

Typhlops psammophilus Anandale 1906 Mem Asiatic Soc Bengal 4 p 193 (Planned, S India London and Calcutta)

Like *braminus* but of more slender proportions Frontal $\frac{1}{2}$ the breadth of the head nasal suture to the preocular diameter of the body 55-75 times in the total length, 370-400 transverse rows of scales

Total length 140 mm

Whether I am correct in reviving Günther's *psammeces* as distinct from *braminus* remains to be seen. The greater slenderness of the body and the increased number of transverse scale rows distinguish it from the typical form but more material may show that it is only a variant The exact locality of Günther's specimen is not known—the word Madras covered a large area in his days—but the locality of Anandale's *psammophilus* which I regard as conspecific with *psammeces* is quite clear, it is certainly very different from his *arenicola* which came from the same district

5 *Typhlops albiceps*

Typhlops albiceps Boulenger 1898 Ann Mag Nat Hist (7) 1 p 124 (Chantabun, S E Siam London) and Fauna Malay Pen. 1912, p 103 Flower P Z S 1889 p 654 pl xxxvii, fig 1

Typhlops melanurus Rendahl 1927 K Sven Vet Akad Stockholm, xxix A, 10 p 11 (Dawna Hills Burma Stockholm not seen by me)

Snout rounded, strongly projecting; nostrils lateral. Rostral $\frac{1}{2}$ to $\frac{2}{3}$ the width of the head, extending to the level of the eyes; nasal incompletely divided, the upper cleft not reaching the rostral, the lower passing to the 1st or 2nd labial; preocular as long as the ocular or the posterior nasal; eye small, just distinguishable; lower edge of ocular shield wedged in between the 3rd and 4th upper labials; head shields larger than the scales on the body; prefrontal in contact with the rostral. Tail ending in a fine point; 20 scales round the body (not 18 as given by Boulenger), the diameter of which is contained about 60 times in the total length.

Light brown, paler below; head, neck, tail and anal region white.

Total length: 180 mm.

Range. Siam (Bangkok, Chantabun, San Kampeng Mts.); the Larut Hills, Perak, in the Malay Peninsula; Burma (Dawna Hills).

To this species I also refer a specimen in the Paris Museum collected by Monsieur Colani in French Indo-China, exact locality not known. In morphological characters it agrees entirely with *albiceps*, but it is considerably larger, being 255 mm. in total length, diameter 5 mm. Most of the head is white, but not the neck. The eyes are not visible, but this may be due to the fact that the creature is about to slough, its general colour being grey.

6. *Typhlops thurstoni*.

Typhlops thurstoni Boettger, 1890, Ber. Senck. Ges. Frankfurt, p. 297 (Nilgiris; Frankfurt; not seen by me); Sarasin, Zool. Jahrb. Jena, 1910, p. 137; Wall, J. Bombay N. H. S. xxvi, 1910, p. 556.

Typhlops walli Procter, 1924, Ann. Mag. Nat. Hist. (9) xiii, p. 139, fig. head (Wynaad, S. India; London).

Snout broadly rounded, strongly projecting; nostrils lateral. Rostral broad above, $\frac{1}{2}$ to $\frac{2}{3}$ as broad as the head, extending to the level of the ocular shields; nasal incompletely divided, the suture passing from the 2nd labial to just beyond the nostril; ocular and preocular shorter than the nasal; eye not distinguishable; ocular shield touching 3rd and 4th labials, not wedged in between them; prefrontal half as broad as the head, in broad contact with the rostral; supraocular twice as broad as long; tail ending in a point; 20 scales round the body, the diameter of which is 50-80 times in the total length; 550-600 transverse rows of scales.

Light brownish or yellowish above, paler below; snout and anal region whitish.

Total length: 300 mm.

Range. S. India (Nilgiris; Trichur, Cochin State).

Known from 4 specimens.

7 *Typhlops jerdoni*

Typhlops jerdoni Boulenger 1890 F B I p 238 and Cat Sn Brit Mus i, 1893 p 19 pl. i, fig 6 (Khasi Hills London) Wall, J Bombay N H. 8 xix, 1909 p 235, and xxvi, 1919 p 865 and xxix, 1923 p 349
Typhlops diversiceps Annandale, 1912, Rec Ind. Mus. viii p 44 pl v fig 1 (Paahghat, Abor Country Calcutta)

Snout rounded strongly projecting nostrils lateral Rostral narrow its breadth $\frac{1}{2}$ to $\frac{2}{3}$ that of the head extending to the level of the eyes nasal completely divided the lower cleft passing to the 2nd labial ocular and preocular longer than the posterior nasal eye very distinct in the ocular lower edge of ocular shield wedged in between 3rd and 4th labials supraocular larger than the prefrontal which is in contact with or just separated from the rostral tail ending in a spine 22 scales round the body the diameter of which is contained 35-45 times in the total length 250-280 transverse rows of scales

Dark brown or blackish above light brown below snout and anal region whitish

Total length 290 mm.

Range Eastern Himalayas (Sikkim Darjeeling Duars dists) Assam (Abor and Khasi Hills) Upper Burma (Lashio) Wall (1919) records a specimen from Pegu

8 *Typhlops leucomelas*

Typhlops leucomelas Boulenger 1890 F B I p 237 (Haycock Mt., near Galle Ceylon London) and Cat Sn Brit Mus i 1893 p 18 pl i, fig 4 Wall Sn Ceylon, 1901 p 13 fig and Spol Zeyl. xii, 1902 p 253 and J Bombay N H 8 xxix, 1923 p 350

Differs from *jerdoni* as follows — Breadth of rostral above that of the head diameter of the body 32 times in the total length

Black above whitish below the two colours meeting in a clear line of demarcation.

Total length 130 mm

The type is from near Galle There is a second specimen in the Colombo Museum without precise locality

9 *Typhlops tenuicollis*

Onychocephalus (Ophthalmodon) tenuicollis Peters, 1864, Mon. Akad. Berlin, p 272 pl. — fig 2 (Himalayas; Berlin not seen by me) — *Typhlops tenuicollis* Boulenger F B I, 1890, p 41 and Cat Sn Brit. Mus. i, 1893 p 37; Wall, J Bombay N H. 8 xxix, 1923 p 350
Typhlops theobaldianus Stoliczka, 1871 J A. S. Bengal, xi, p. 429 pl. xiv figs 6-8 (type loc unknown Calcutta) Boulenger F B I. 1890 p 240 and Cat Sn. Brit. Mus. i, 1893 p 26 Wall, J Bombay N H. 8 xxix, 1903 p 350

Snout broadly rounded, strongly projecting; nostrils lateral. Rostral half as broad as the head, extending to the level of the ocular shields; nasal incompletely divided, no upper suture, the lower passing to the 1st labial; ocular shorter than the preocular, posterior nasal longer than both; eye not or just distinguishable; lower edge of ocular shield wedged in between 3rd and 4th labials; supraocular twice as broad as long; prefrontal in contact with the rostral; tail ending in a point; 22 scales round the body, the diameter of which is contained 65-70 times in the total length; 480-520 transverse rows of scales.

The type of *theobaldianus* is now considerably broken up and discoloured, but the characters necessary for identification are fortunately intact.

Boulenger (F. B. I. p. 236) has placed *tenuicollis* in a section by itself, the nostrils said to be inferior. Peter's figure, on the other hand, shows the nostrils lateral, and in all other respects the description agrees so completely with *theobaldianus* that I have no hesitation in uniting them. A third specimen has since been obtained by Capt. Butler at Samagutin, Naga Hills, Assam.

10. *Typhlops diardi*.

DIARD'S BLIND SNAKE.

Typhlops diardi Schlegel, 1839, Abbild. Amphib. p. 39 (Indes Orientales; Paris); Dum. & Bibr., 1844, Érp. Gén. vi, p. 300; Jan, Icon. Ophid. p. 19, liv. 3, pls. iv, v, fig. 10; Boulenger, F. B. I. 1890, p. 238, and Cat. Sn. Brit. Mus. i, 1893, p. 22; Annandale, Rec. Ind. Mus. viii, 1912, p. 44; Wall & Evans, J. Bombay N. H. S. xliii, 1901, p. 620; Wall, ibid. xxv, 1918, p. 381, col. pl., and xxix, 1923, p. 351, and xxx, 1925, p. 805, and xxxi 1926, p. 558; Venning, ibid. xx, 1911, p. 770.—*Typhlops diardi diardi*, Smith, J. N. H. S. Siam, vi, 1923, p. 52, and Rec. Ind. Mus. xlii, 1940, p. 478.

Typhlops mulleri Schlegel, 1839, Abbild. Amphib. p. 39, pl. xxxii, figs. 25-28 (Padang, Sumatra; Leiden).—*Typhlops diardi mulleri*, Brongorsma, Zool. Meded. Leiden, xvii, 1934, p. 193.

Typhlops nigroalbus Dum. & Bibr. 1844, Érp. Gén. vi, p. 295 (Sumatra; Paris).—*Typhlops diardi nigroalbus*, Smith, J. N. H. S. Siam, vi, 1923, p. 52.

Typhlops schneideri Jan, 1864, Icon. Gen. Ophid. i, liv. 9, pl. i, p. 20, fig. 3 (Bangkok; Milan).

Argyrophis horsfieldi Gray, 1845, Cat. Liz. Brit. Mus. p. 137 (Khasi Hills; London).

Argyrophis bicolor Gray, l. c. s. p. 136 (Singapore; London).

Typhlops striolatus Peters, 1861, Mon. Akad. Berlin, p. 922 (Calcutta; London and Berlin).

Typhlops siamensis Günther, 1864, Rept. Brit. Ind. p. 175, pl. xvi, fig. D (Siam; London).

Typhlops barmanus Stoliczka, 1872, Proc. A. S. Bengal, p. 144 (near Moulmein, Burma; Calcutta).

Typhlops tephrosoma Wall, 1908, J. Bombay N. H. S. xviii, p. 314 (Khasi Hills; London), and ibid. xxx, 1925, p. 805.

Typhlops cinereus Wall, 1909, J. Bombay N. H. S. xix, p. 609 (Upper Assam).

Snout rounded strongly projecting nostrils lateral. Upper portion of rostral $\frac{1}{2}$ to $\frac{3}{4}$ the breadth of the head extending to the level of the eyes or not quite so far, nasal incompletely divided the lower cleft passing to the 2nd labial, ocular and pre-ocular shorter than the posterior nasal, eye distinct usually in the ocular shield the lower edge of which is wedged in between 3rd and 4th labials prefrontal in contact with the rostral Tail ending in a small spine Diameter of the body contained 26-32 times in the total length 260-300 transverse rows of scales (for specimens of diardi diardi).

Total length 430 mm The young in the specimen referred to on p. 44 measure about 100 mm in length, diameter 2.5 mm



Fig. 15.—Snout of *Typhlops diardi diardi* seen from below. The imbricate portion of the scale covering the pit has been cut away.

The type of *diardi* was said by Schlegel to have come from Cochin China, but Dumeril and Bibron writing of the specimen later state that its exact locality of origin is not known. All the specimens that I have seen from Cochin China agree with the Malayan form and must therefore be labelled *muelleri*.

The distribution of the two forms will now stand as follows—

Typhlops diardi diardi

24 to 26 rarely 28 scales round the body. Brown to blackish above, paler below, the two colours not strongly contrasted.

Range Bengal, Assam, Burma and French Indo-China north of lat. 16°.

Typhlops diardi muelleri

24 to 26 rarely 22, scales round the body. Blackish olive to brown above, yellowish white below, the two colours with a clear line of demarcation.

Range Burma, Siam and French Indo-China south of lat. 14°, the Malay Peninsula and Archipelago.

I have not yet seen any examples from between lats. 14° and 16°.

11. *Typhlops oatesi*.

Typhlops oatesi Boulenger, 1890, F. B. I. p. 238, and Cat. Sn. Brit. Mus. i, 1893, p. 23 (Table I, Coros Group, Andamans : London) ; Wall, J. Bombay N. H. S. xxix, 1923, p. 350.

Snout rounded, strongly projecting ; nostrils lateral. Rostral narrow, its breadth $\frac{1}{4}$ that of the head, reaching to between the eyes ; nasal nearly completely divided ; the lower cleft passing to the 2nd labial ; ocular and preocular longer than the posterior nasal ; the lower edge of the ocular wedged in between 3rd and 4th labials ; eye very distinct, in the ocular shield ; prefrontal in contact with the rostral : tail ending in a small spine : 24 scales round the body, the diameter of which is contained 32 times in the total length.

Yellowish-brown, with confluent dark spots in the centres of the scales, forming longitudinal lines down the body ; on the middle of the belly they are absent.

Total length : 200 mm.

Range. Known only from the three type-specimens.

12. *Typhlops bothriorhynchus*.

Typhlops bothriorhynchus Günther, 1864, Rept. Brit. Ind. p. 174, pl. xvi, fig. G (" Penang " : London) ; Stoliczka, J. A. S. Bengal, xl, 1871, p. 424 : Boulenger, F. B. I. 1890, p. 239, and Cat. Sn. Brit. Mus. i, 1893, p. 23 ; Wall, J. Bombay N. H. S. xxix, 1923, p. 350.

Snout rounded, strongly projecting ; nostrils lateral. Rostral narrow, its upper portion about $\frac{1}{3}$ the width of the head, extending to the level of the eyes ; nasal nearly completely divided, the lower cleft passing to the 2nd labial ; ocular, preocular, and posterior nasal subequal in length : eye very distinct, in the ocular shield, the lower edge of which is wedged in between 3rd and 4th labials ; prefrontal in contact with the rostral. A distinct but shallow depression on each side of the snout, below the nostril, the nasal cleft passing through it : tail ending in a small spine : 24 scales round the body, the diameter of which is contained 30 times in the total length ; 300-330 transverse rows of scales.

Brown above, paler below.

Total length 180 mm.

Range. Assam. The specimen recorded by Stoliczka from Hardwar, U. Provinces, cannot now be found.

13. *Typhlops tindalli* *, sp. nov.

Typhlops thurstoni (not of Boettger) Boulenger, 1893, Cat. Sn. Brit. Mus. i, p. 26 ; Procter, Ann. Mag. Nat. Hist. (9) xiii, 1924, p. 139, fig. head.

Typhlops beddomei (not of Boulenger). Wall, 1919, J. Bombay N. H. S. xxvi, p. 556.

* Named after Mr. Roger Tindall.

Snout rounded, strongly projecting; nostrils lateral. Rostral broad, $\frac{1}{2}$ the width of the head, scarcely reaching half way to the level of the ocular shields. nasal incompletely divided, the lower suture passing to the preocular, that shield being in good contact with the anterior nasal; posterior nasal very large, in good contact with its fellow behind the rostral, no visible eye, ocular shield much smaller than the preocular, touching the 3rd and 4th labials, not wedged in between them; supraocular twice as broad as long, prefrontal and frontal larger than the scales on the body. Tail rounded, no trace of a spine, 18 scales round the body, the diameter of which is contained 50 times in the total length, about 300 transverse rows of scales.

Uniform isabelline yellow

Total length 175 mm.

The types, 3 in number, are from Nilambur, Malabar district. To this species I also refer the specimen, now apparently lost, identified as *beddomes* by Wall from Pilloor in the Nilgiri Hills (1919).

Boulenger's description in the Catalogue is an abbreviated translation of Boettger's, but the two specimens listed by him as from Nilambur, and labelled *thursioni* on the bottle, are something entirely different, and represent an undescribed and very distinct species.

14 *Typhlops beddomes*

Typhlops beddomes Boulenger, 1896, F. B. I. p. 237, and Cat. Sn. Brit. Mus. 2, 1897 p. 18, pl. 1 fig. 3 (Hills of S. India; London).

Snout rounded, strongly projecting, nostrils lateral. Breadth of rostral $\frac{1}{2}$ that of the head, not reaching to the level of the eyes, nasal completely divided, the lower cleft passing to the 2nd labial, posterior nasal very large, much larger than the ocular or preocular, in contact with its fellow behind the rostral, eye fairly distinct, lower edge of ocular shield usually not wedged in between the 3rd and 4th labials, supraocular twice as broad as long, tail ending in a point, 18 scales round the body, the diameter of which is 20 to 30 times in the total length, 190-200 transverse rows of scales.

Brown above, pale below, snout and anal region whitish, a more or less distinct dark vertebral line often present.

Total length 110 mm (140 mm Wall)

Range Hills of Southern India, between 2,000-5,000 feet (Travancore, Anamalais Hills, Cochin State, Tinnevely). There are in the British Museum 4 specimens said to be from the Kundery Hills, Vazgapattam district, collected by Col. Beddom.

As already stated (p. 44), in this species the glandular

structures are more richly developed than in any other Indian species, the whole of the head in front of the eyes being studded with them.

15. *Typhlops oligolepis*.

Typhlops oligolepis Wall, 1909, J. Bombay N.H. S. xix, p. 339, fig. (Nagri Valley, Darjeeling dist., 5000 feet; London), and xxix, 1923, p. 347.

Closely allied to *beddomei*, differing as follows:—Rostral smaller, the portion visible above only extending to about half-way between the tip of the snout and the level of the eyes; eyes less distinct: tail without point; 16 scales round the body, the diameter of which is contained 50 to 60 times in the total length.

Brown above, paler below.

Total length: 145 mm.

Range. The Eastern Himalayas, 5,000 feet (Sikkim, Nagri Valley; Darjeeling district).

Three specimens are known.

16. *Typhlops mirus*.

Typhlops mirus Jan, 1860, Icon. Gen. Liv. i, pls. iv.-v. fig. 7 (Ceylon; Leyden); Günther, Rept. Brit. Ind. 1864, p. 176, pl. xvi, fig. H; Boulenger, F. B. I. 1890, p. 240, and Cat. Sn. Brit. Mus. i, 1893, p. 52; Wall, Sn. Ceylon, 1921, p. 7, fig. head, and J. Bombay N. H. S. xxix, 1923, p. 348.

Snout rounded, strongly projecting; nostrils lateral. Rostral broad, about $\frac{1}{2}$ as broad as the head, nearly reaching to the level of the eyes; nasal completely divided, the lower suture passing to the 2nd labial; ocular and preocular small, much shorter than the posterior nasal, the latter separated from the labials by a subocular which is wedged in between them above and is in contact with the 2nd, 3rd, and 4th labials below; eye scarcely distinct, the ocular shield in contact with the 4th labial only; prefrontal in contact with the rostral. Tail bluntly pointed, without spine; 18 scales round the body, the diameter of which is contained 40-50 times in the total length; 330-360 transverse rows of scales.

Brown above, paler below; snout and anal region whitish.

Total length: 140 mm.

Range. Ceylon, in the hills. Known definitely from Peradeniya.

17. *Typhlops ceylonicus*, sp. nov.

Snout rounded, strongly projecting; nostrils lateral; rostral nearly half the width of the head; nasal completely divided, the lower suture passing to the second labial, the posterior shield very large, in good contact with its fellow

behind the rostral ocular and preocular small, the latter separated from the labials by a subocular, which is wedged in between them above and is in contact with the 2nd, 3rd, and 4th labials below no visible eye the ocular shield in contact with the 4th labial only tail blunt, without terminal spine 18 scales round the body, the diameter of which is 35 times in the total length about 330 transverse rows of scales

Brown above yellowish-white below

Total length 140 mm

Known from a single specimen obtained at Peradeniya, Ceylon

Type in the Indian Museum Closely related to *T. mirus*, from which it differs in having the nasals in contact with one another behind the rostral and in its stouter proportions

18 *Typhlops andamanensis*

Typhlops andamanensis Stoliczka, 1871 J. A. S. Bengal xl, p. 478 pl. xxv figs 9-12 (Andaman Is. Calcutta) Boulenger ? B. I. 1890 p. 241 and Cat. Sn. Brit. Mus. i 1893 p. 57, Wall. J. Bombay N. H. S. xxix, 1903 p. 343

Snout rounded strongly projecting nostrils lateral. Breadth of rostral $\frac{1}{4}$ that of the head, extending to the level of the eyes nasal completely divided, the lower suture passing to the 2nd labial ocular and preocular shorter than the posterior nasal both shields separated from the labials by two smaller shields the one below the ocular touching the 3rd and 4th labials, not wedged in between them, eye indistinct, prefrontal in contact with the rostral tail obtuse ending in a spine 18 scales round the body, the diameter of which is contained 17-20 times in the total length

Brownish-black above sides vinaceous paler below, where it is chequered with white mouth and tail below white

Total length 160 mm

This description is drawn up from Stoliczka's text and drawing The only specimen which he had is unfortunately lost

19 *Typhlops acutus*

THE BEAKED BLIND SNAKE.

Onychocephalus acutus Dum. & Bibr. 1844 Exp. Gén. vi p. 333 (type loc. unknown Pers.)—*Typhlops acutus* Boulenger F. B. I. 1890 p. 241 and Cat. Sn. Brit. Mus. i 1893 p. 56, Annandale J. A. S. Bengal, lxviii, 1904, p. 203, Wall. J. Bombay N. H. S. xvi, 1903 p. 332, and xxv 1918, p. 377, col. pl. and xxix, 1903 p. 351

Onychocephalus westerni Lütken, 1862 Vid. Medd., Kjøbenhavn, p. 306 p. l. fig. 5 (India).

Typhlops eximius Jan, 1885 Icon. Gen. Oph., Lav. 1, pl. 1, fig. 5 (Indes Orientales Cologne)

Snout pointed and hooked, projecting strongly, with sharp horizontal edge; nostrils inferior. Rostral very large, covering most of the head above, extending posteriorly to well behind the level of the eyes; nostril close to the rostral, the suture passing from it to the 2nd labial, the anterior nasal being extremely small; a long, narrow preocular: a subocular in contact with the 3rd and 4th labials; ocular largely in contact with the nasal, the eye mostly in the latter shield; prefrontal in contact with the rostral, both it and the supraocular being three to four times broader than long. Tail ending in a small spine; 28-34 scales round the body, the diameter of which is contained 40-60 times in the total length; 450-500 transverse rows of scales.

Brown above, paler below. In many individuals each scale of the back and sides has a pale yellow centre.

Total length 600 mm.



Fig. 16.—Dorsal and lateral view of head of *Typhlops acutus*.
l., labial; n., nasal; o., ocular: pro., preocular; r., rostral.

Range. India, south of the Ganges Basin and south of Rajputana, west to Baroda and east to Calcutta. Rare south of lat. 16°. The largest of all the Oriental species of *Typhlops*.

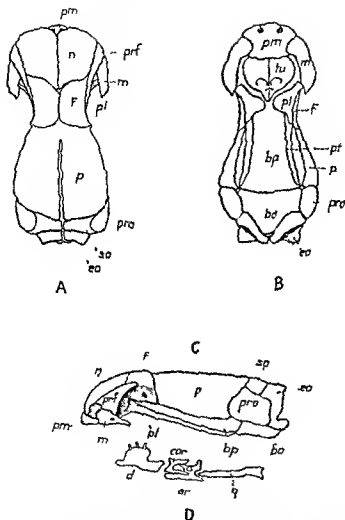


Fig 17—Skull of *Leptotyphlops distant*. Drawn from a specimen stained with alizarin. (BM Coll 99320 17-20) \times about 15. A. Dorsal, B. Ventral, C. Lateral view. The mandibles have been removed. D. Outer view of left mandible.

ar., articular; bo, basioccipital; bp., basisphenoid; cor., coronoid; d., dentary; eo, exoccipital; f., frontal; m, maxilla; n, nasal; p, parietal; pl, palatine; pm., premaxilla; prf, prefrontal; pro., prootic; pt, pterygoid; q., quadrate; so., supraoccipital; tu, turbinal.

Family LEPTOTYPHLOPIDÆ.

Leptotyphlopidae Stejneger, 1891, Proc. U.S. Nat. Mus. xiv, p. 501.
Glauconiidae Boulenger, 1890, F. B. I. p. 242, and Cat. Sn. Brit.
 Mus. i, 1893, p. 57.

Palato-maxillary arch incomplete, no ectopterygoid; maxilla bordering the mouth, in suture with the prefrontal and premaxilla, toothless; prefrontal forming a suture with the nasal; no supratemporal; mandible with coronoid bone, toothed; quadrate elongate, directed horizontally forwards. Pelvis present, consisting of ilium, ischium, and pubis; a vestigial femur usually present. Body cylindrical, of equal

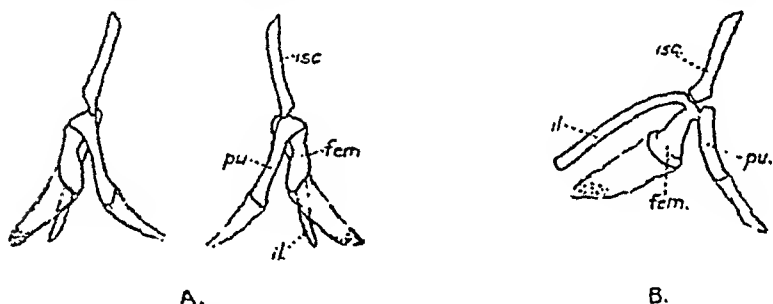


Fig. 18.—A. Ventral view of pelvic girdle of *Leptotyphlops distanti*. Drawn from a specimen stained with alizarin. B. Lateral view of right half of girdle.

fem., femur; *il.*, ilium; *isc.*, ischium; *pu.*, pubis. The cartilaginous continuations of the pubis and femur are shown.

diameter throughout, covered with uniform cycloid scales; eyes under the shields.

Range. Africa, S.W. Asia, Southern U.S.A., Tropical America.

Small degenerate burrowing snakes bearing a close superficial resemblance to the Typhlopidae. The Indian species can be distinguished externally from *Typhlops* in having the nasal and ocular shields bordering the lip, an enlarged pre-anal plate, and in having only 14 scales round the body.

As in the Typhlopidae incomplete ossification of the bones of the cranium may occur. In the specimen of *Leptotyphlops nigricans* (= *distanti*), figured by Brook (1932), the parietals are fused into a single bone: in the specimen here figured (Brit. Mus. Coll.), a fully grown individual, they are incompletely separated; the foramen magnum, which is very large,

is formed entirely by the exoccipital. In a specimen of *L. macrorhynchus* (Brit Mus Coll.) stained with alizarin the whole of the top of the brain case appears unossified.

In the Leptotyphlopidae the pelvic girdle and hind limbs show less reduction than in any recent snakes. The vestigial femur in some species is covered with a horny spur and projects through a small slit in the skin on each side of the vent.

Genus LEPTOTYPHLOPS

- Leptotyphlops* Fitzinger 1843 Syst Rept p 24 (type *nigricans*):
 Brock Anal Anz Jena lxxix 9/10 1932 p 177
Glauconia Gray 1845 Cat Lix Brit Mus p 139 (type *nigricans*):
 Boulenger Y B I 1890 p 243 and Cat Sn Brit Mus I, 1893
 p 50. Exem J Z 8 1927 p 679. Werner Mitt Zool Mus
 Hamburg xxiv 1917 p 191. Haas Zool Jb Jena Anat lvi,
 I 1931 p 127.

Rostral nasal and ocular shields very large all three bordering the lip other head shields more or less distinctly enlarged preanal enlarged 14 scales round the body.

Range S W Asia Africa America Two species in the Indian region

Key to Species

- Snout hooked, its lower surface (in front of the mouth)
 concave diameter of body 80-110 times in the total length [p 60
 Snout not hooked diameter of body 55-80 times in the total length *macrorhynchus* [p 61,
blanfordi

20 *Leptotyphlops macrorhynchus*

- Stenotoma macrorhynchus* Jan, 1862 Arch Zool Anat Fis.,
 Genova I p 190 (Sennar Egypt Sudan Milan) and Icon Gen.
 Liv I 1866 p 39 pl v fig 12 and pl vi fig 12 — *Glauconia*
macrorhynchus Boulenger Ann Mag Nat Hist (6) vi 1890,
 p 82 and Cat Sn Brit Mus I 1893 p 61, Wall J Bombay
 N H S xv I 1908 p 796 and xxix 1923 p 352

Snout prominent hooked its lower surface (in front of the mouth) concave rostral half as broad as the head extending to the level of the eyes nasal completely divided its inferior portion bordering the lip ocular bordering the lip between two labials eye conspicuous in the ocular, other head shields more or less distinctly enlarged, 14 scales round the body, the diameter of which is 80-110 times in the total length.

Very light brown or fawn in colour

Total length 280 tail 20 mm (specimen from Jask Persia).
 Range Sind (Karachi) Baluchistan (Quetta) Persia,
 Arabia

Whether the snake from India Persia and Arabia is conspecific with the true *macrorhynchus* from Africa, cannot be decided without more material for comparison.

21. *Leptotyphlops blanfordi*.

Glauconia blanfordii Boulenger, 1890, F. B. I. p. 243 (Sind: London), and Cat. Sn. Brit. Mus. i, 1893, p. 66; Alcock & Finn, J. A. S. Bengal, lxx, 1896, p. 561; Wall, J. Bombay N. H. S. xx, 1911, p. 1033, and xxix, 1923, p. 351.
Glauconia carltoni Barbour, 1908, Bull. Mus. C. Z. Harvard, li, p. 316 (Amballa, Punjab; Harvard); Barbour & Loveridge, ibid. lxxix, 1929, p. 269.

Like *macrorhynchus* in scale characters but the snout rounded, not concave inferiorly, and the body of slightly stouter proportions, 55-80 times in the total length.

Total length: 240, tail 20 mm. (Sind).

Range. Sind (Kotri, Hyderabad) · Punjab (Amballa, Multan); N.W.F.P. (Jamrud Terah); Baluchistan (Sibi, *vide* Wall). Alcock & Finn record *blanfordi* from Koh-i-Malik Siah in the extreme north-west corner of Baluchistan, but the specimens are not now available for examination. They were said to be pink in life and very active.

Family UROPELTIDÆ.

UROPELTIS; ROUGH-TAILS.

Uropeltacea J. Müller, 1832, Zeitschr. Physiol. iv, p. 270; Peters, Serp. Fam. Uropelt. 1861, p. 1; Hoffstetter, Bull. Mus. Hist. Nat. Paris, (2) 1939, p. 426.

Rhinophis Fitzinger, 1843, Syst. Rept. p. 24.

Uropeltidae Gray, 1845, Cat. Liz. Brit. Mus. p. 140; Boulenger, F. B. I. 1890, p. 251, and Cat. Sn. Brit. Mus. i, 1893, p. 137; Procter, Ann. Mag. Nat. Hist. (9) xiii, 1924, p. 142; Baumeister, Zool. Jahrb. Anat. 1908, p. 423, pl., and 1910, p. 659; Haas, Zool. Jahrb. Jena, lii, 1930, p. 132; Radovanovic, Jena Zeitschr. Naturw. lxxi, 1937, p. 203.

Bones of the skull solidly united; maxilla with from 6 to 8 teeth, the palatine with 3 or 4 minute teeth in *Platyplectrurus* and *Melanophidium*, absent in the other genera; prefrontal in contact with the nasal; quadrate very short, vertically placed; no supratemporal; no postorbital; mandible with coronoid bone, bearing 8 to 10 teeth.

Head not distinct from neck; eye with round pupil; body cylindrical, rigid, tail very short. Four supralabials are constant throughout the family, and there is no loreal.

In the Uropelts the cranial bones are more solidly united than in any other family of snakes, a consequence brought about no doubt by their fossorial habits. Without solid union of the bones no forcible burrowing would be possible. The occipital bones are firmly connected to one another, and to the prootic and the basisphenoid, so that in the fully grown individual the sutures cannot be distinguished. In the

same way the premaxilla is united to the maxilla. The occipital condyle projects markedly beyond the back of the skull. Its structure and articulation with the atlas and axis have been described by Hoffstetter (1939).

The hemipenis is very small owing to the extreme shortness of the tail, and it is difficult to examine satisfactorily. Two entirely different types of hemipenis, at least, can be distinguished. In *Melanophidium punctatum* it is comparatively short and thick, and is furnished with a series of long convoluted folds through which the sulcus spermaticus winds (when seen in the organ at rest); there are no spines. In *Uropeltis grandis* the organ is longer and more slender and is finely spinose throughout. The sulcus is not bifurcated.

The members of this family are confined to the Peninsula of India and Ceylon; in India their centre is in the Western Ghats and the extreme south; one species only, namely *Uropeltis ellioti*, extends its range into the east. The majority of the species are extremely local in their distribution. All are of small size, few of them exceeding a foot in length.

To Col. Beddome, more than any other naturalist, we owe our knowledge of this family, and the magnificent collection made by him is now in the British Museum. The secretive habits of these snakes often makes it difficult to obtain them without careful searching, and it is probable, in districts that have not been investigated, that new forms will yet be found.

They inhabit the mountainous districts, often at very high altitudes, and the forested areas at the foot of the mountains, living under logs or stones or buried in the earth. After heavy rain they are often seen on the roads or in gardens.

In soft earth they can burrow quickly and easily, digging their way into the soil with the snout. This habit has led to marked development of the muscles of the trunk, particularly the anterior ones, and in many species the thickness of the fore part of the body is greater than that of the head. In addition there is a lateral bend in the neck, so that the long axis of the head is not in a line with that of the body (fig. 23).

The purpose of the peculiar tail of *Rhinophis* and some species of *Uropeltis* has not yet been satisfactorily explained. McCann (1924) states that *U. macrolepis* uses it as a stopper to plug up the entrance to the hole where he is buried. Nicholls (1929) says that "the purpose of this shield is to allow the snake to obtain a purchase as it pushes its way through the soil." On the other hand, Wall writing of *U. ceylonicus*, which has quite as efficient a "stopper" as *macrolepis*, says that "nothing in its behaviour suggested any use for the tail."

He remarks also upon the frequency with which the end of the tail in freshly caught specimens is coated with mud.

The evolution of the head and tail have not followed one another *par passu* that is to say, the species which show the greatest specialization of the tail do not always show the greatest change of the head shields. In *Platyplectrurus*, the least specialized genus the normal head shields are present, adaptation to a fossorial life has led to reduction in the size of the eye, the formation of an ocular shield, and to the development of a large and beak like rostral shield. This development culminates in such forms as *Uropeltis macrorhynchus* and *Rhinophis oxyrhynchus*.

The so called ocular shield is formed by the union of the supra- and postoculars and subsequent growth of the two shields so that the eye lies completely within the margin of the shield. In no species is there any recess between the eyeball and the orbit, as in most snakes, the transparent 'window' of the eye being united with the surrounding structures.

The evolution of the tail in the genus *Uropeltis* has proceeded along two lines. In one there is flattening of its upper extremity, with modification of the scales covering that part, a type which leads to the obliquely truncate and highly specialized disc of the *macrolepis broughami* group (Sect. II). In the other (Sect. III, *maculata-grandis*) the tail is cylindrical or compressed, the caudal scales are not modified, and the terminal scute ends in a transverse ridge with two points placed side by side. In *melanogaster* and *phillipsi*, however, the scute has become convex, it is higher than long and the terminal points have almost disappeared, thus foreshadowing the caudal shield of *Rhinophis*.

In disposition the Uropeltis are quiet and inoffensive. They do not bite when handled, however much they are irritated, nor do they appear to have any fear. When picked up they do not try to escape, but will twine themselves round the fingers or a stick, and remaining in that position can be carried long distances. They have been known to eat immediately after being caught. They are easily kept in captivity, feeding chiefly upon worms and the soft bodied larvae of insects.

As far as is known all the species are viviparous, producing from 3 to 8 young at a time.

Some of the species are brilliantly coloured with red, orange, or yellow, a blue or green colour is unknown amongst them, the black forms are remarkable for their iridescence.

It is unfortunate that Gray's name *Silybura*, which has been so long in use cannot stand, but Fitzinger's action, in fixing the type of *Uropeltis* two years earlier is quite clear.

Key to the Genera.

- I. A mental groove MELANOPHIDIUM,
 II. No mental groove [p. 65.]
 A. Eye distinct from the surrounding shields. Terminal caudal scute depressed, with lateral ridges [p. 67.]
 PLATYPLECTRURUS,
 B. Eye not distinct from the surrounding shields. Terminal caudal scute simple, without ridges, compressed..... TERETRURUS, p. 69.
 Terminal caudal scute ending in two superposed points, which may be simple or compound . PLECTRURUS, p. 71.
 Tail usually obliquely truncate, the truncated portion covered with thickened differentiated scales; terminal caudal scute ending in a transverse ridge or two points side by side UROPELTIS, p. 73.
 Tail ending in a convex or flattened, rounded, rugose shield RHINOPHIS, p. 87.
 End of tail with a large, subcircular, flat, spinose shield above [p. 93.]
 PSEUDOTYPHLOPS,

Genus MELANOPHIDIUM.

Melanophidium Günther, 1864, Rept. Brit. Ind. p. 193 (type *wynaudense*); Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 29; Boulenger, F. B. I. 1890, p. 272. and Cat. Sn. Brit. Mus. i. 1893, p. 163.

A mental groove. Eye in the ocular shield; no supra-ocular or temporal shield. Tail feebly compressed; caudal

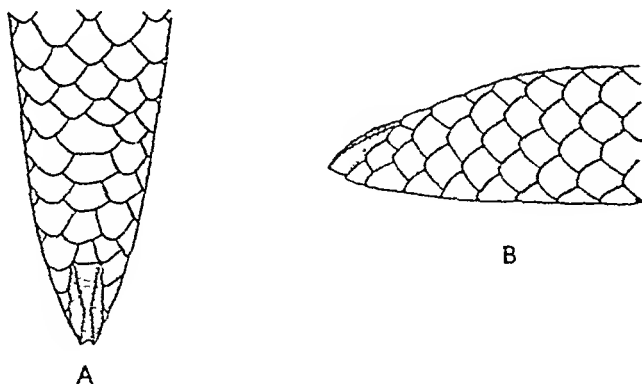


Fig. 20.—Tail of *Melanophidium punctatum*.

A. Dorsal, B. Lateral view.

scales smooth; terminal scute with lateral or superior ridges which converge to the tip. Scales in 15 rows.

Key to the Species

- I Suture between the ocular and frontal less than one third the length of the latter shield.
- Ventrals and outer 3-3 scale rows white with a black centre *punctatum*, p 66.
- Belly entirely black with a broad white stripe on each side *bilineatum*, p 66
- II. Suture between the ocular and frontal more than one-third the length of the latter shield
- Black, with or without large yellow spots below , , *wynaadeni*, p 67

22 *Melanophidium punctatum*.

Melanophidium punctatum Beddome 1871, Madras Monthly J Med Sci p 401 (Travancore, London); Günther, P. Z. S. 1875 p 230 pl. xxxii, fig. B; Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p 31. Boulenger, F. B. L. 1890, p 273, and Cat. Sn. Brit. Mus. i, 1893 p 164, Ferguson, J. Bombay N. H. S. x, 1895, p 70, Wall, J. Bombay N. H. S. xxix, 1914 p 377, and xxix, 1923, p 360

Snout obtuse, rostral small, the portion visible from above equal to or less than half the distance between it and the frontal, frontal variable in size, longer than broad, the length of the suture between it and the supraocular 3 or 4 times in the length of the frontal, eye one-third the length of the ocular shield V 180-198, nearly twice as broad as the adjacent scales, C 11-18 Tail compressed; caudal scales smooth, terminal scute mostly on the upper surface of the tail, with two parallel ridges above forming two (sometimes four) points at the tip In the young the scute is simply pointed and without ridges

Iridescent black above, ventrals and outer two or three scale rows white with black centres

Total length 560, diameter 14 mm

Range S India. Travancore Hills, 4,000-5,000 feet; Anamalai Hills, Telwady, Goa Frontier

23 *Melanophidium bilineatum*.

Melanophidium bilineatum Beddome, 1870, Madras Monthly J Med Sci p 167 (Wynaad*, London), Günther, P. Z. S. 1875, p 230, pl. xxxi, fig. A; Beddome Ann. Mag. Nat. Hist. (5) xvii, 1886, p 30. Boulenger, F. B. L. 1890 p 273, and Cat. Sn. Brit. Mus. i, 1893, p 164; Wall, J. Bombay N. H. S. xxix, 1923, p. 360

Similar to the preceding, but the eye smaller, its diameter

* The Wynaad, referred to so often by Beddome and writers of his date, but not found on recent atlases is a highland area in the Malabar District, between Coorg and the Nilgiri Hills

one-fourth the length of the ocular shield, and the ventrals a little broader, twice as broad as the adjacent scales. V. 188-200; C. 15-17. Tail as in the young of *punctatum*.

Iridescent black above and below; the two colours separated by a broad, yellow stripe along scale-row 2 and the adjacent halves of rows 1 and 3; it may or may not have a series of small black dots.

Range. Known from three specimens which are apparently not yet fully grown. They were collected on Peria and Tirrhoot Peaks, west of Manantoddy.

24. *Melanophidium wynaudense*.

Plectrurus wynaudensis Beddome, 1863, P. Z. S. p. 228 (nr. Manantoddy: London).—*Melanophidium wynaudense*, Günther, Rept. Brit. Ind. 1864, p. 194, pl. xvii, fig. 3; Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 30; Boulenger, F. B. I. 1890, p. 272, and Cat. Sn. Brit. Mus. i, 1893, p. 163; Wall, J. Bombay N. H. S. xxvi, 1919, p. 560, and xxix, 1923, p. 360.

Similar to *punctatum*, but the suture between the ocular and the frontal more than one-third the length of the latter shield. Eye usually a little smaller. V. 170-185; C. 10-18. Terminal caudal scute with two superposed lateral ridges which meet on a transverse ridge at the tip.

Iridescent black all over, or with large white or yellow spots on the belly.

Total length; 440, diameter 10 mm.

Range. S. India. Manantoddy dist.; Coorg, 3,000-5,000 feet.

Genus PLATYPLECTRURUS.

Platyplectrurus Günther, 1868, Ann. Mag. Nat. Hist. (4) i, p. 414 (type *trilineatus*); Boulenger, F. B. I. 1890, p. 273, and Cat. Sn. Brit. Mus. i, 1896, p. 165; Procter, Ann. Mag. Nat. Hist. (9), xiii, 1924, p. 141.

Wallia Werner, 1925, Sitz. Ber. Akad. Wiss. Wien, cxxxiv, p. 53 (type *inexpectata*=*madurensis*); Smith, Ann. Mag. Nat. Hist. (10) i, 1928, p. 496.

No mental groove. Eye distinct from the surrounding shields; a supraocular, a postocular, and a temporal shield. Tail compressed, the scales smooth or nearly so; terminal scute depressed, with lateral ridges which meet in a point. Scales in 15 rows.

Key to the Species.

- | | |
|---|-----------------------------|
| Supraocular longer than the prefrontals; dorsum with three black longitudinal lines | <i>trilineatus</i> , p. 68. |
| Supraocular not longer than the prefrontals; uniform purplish brown above | <i>madurensis</i> , p. 69. |

25 *Platyplectrurus trilineatus*

Plectrurus ? tril neatus Beddome, 1867 Madras Quart J Med. Sci. p 14 fig (Anamallays London) and J Soc B biog Nat Hist. London 1940 : p 315 fig (reprint) — *Platyplectrurus trilineatus* Günther Ann Mag Nat Hist (4) I, 1868 p 413 Beddome b d. (5) xvi 1886 p 92 Boulenger P R L 1890 p 274 and Cat Sn Brit Mus : 1893 p 165 Wall J Bombay N H S xxix, 1923 p 360
Platyplectrurus bilineatus Beddome 1886 Ann Mag Nat Hist (5) xvi p 33 (Madras Hills London)

Snout obtuse rostral small the portion visible above equal to half the distance between it and the frontal frontal longer than broad usually shorter than the parietals supra

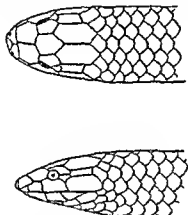


Fig 21 — *Platyplectrurus madagascariensis*

oculars longer than the prefrontals ventrals one and a half times as broad as the adjacent scales V 163-170 C 8-16 Tail more or less compressed the scales smooth or nearly so terminal scute depressed, flat beneath with a lateral ridge on each side the two meeting in a point a less distinct median ridge above in the male the scute larger and the ridges more conspicuous than in the female

When young light brown with three broad dark brown stripes above a vertebral and two lateral or with a series of dark brown lines head dark brown above with a light brown spot on each side of the neck as age advances the central portion of each dark stripe acquires a series of black spots and the adult is reddish brown or brick red above with three continuous or interrupted black longitudinal lines

rarely the vertebral one is absent; lower parts light brown, the edge of each scale being whitish.

Total length 390, diameter 11 mm.

Range. S. India: Anaimalai Hills; Travancore.

26. *Platyplectrurus madurensis*.

Platyplectrurus madurensis Beddome, 1877, P. Z. S. p. 167 (Palni Hills; London), and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 33; Boulenger, F. B. I. 1890, p. 274, and Cat. Sn. Brit. Mus. i, 1893, p. 166; Ferguson, J. Bombay N. H. S. xiv, p. 386; Wall, ibid. xxix, 1923, pp. 360 and 396.

Wallia inexpectata 1925, Werner, Sitz. Akad. Wiss. Wien, xxxiv, p. 53 (type loc. unknown; Vienna); Smith, Ann. Mag. Nat. Hist. (10) i, 1928, p. 496.

Similar to *trilineatus*, but the frontal shorter, always shorter than the parietals, and the supraoculars not longer than the prefrontals.

Nacreous purplish-brown above, ventrals and the two adjoining rows of scales white in the centre, purplish-brown at the edges. V. 158-175; C. 10-15.

Total length: 440, diameter 13 mm.

Range. S. India. Palni and Travancore Hills, 4,000-6,000 ft.

Genus TERETRURUS.

Teretrurus Beddome, 1886, Ann. Mag. Nat. Hist. xvii, p. 28 (type *sanguineus*).

Brachyophidium Wall, 1921, J. Bombay N. H. S. xxviii, p. 41, pl. (type *rhodogaster*); Procter, Ann. Mag. Nat. Hist. (9) xiii, 1924, p. 141; Wall, ibid. (9) xiv, 1924, p. 200.

Platyplectrurus (in part) Boulenger, F. B. I. p. 273, and Cat.

No mental groove. Eye distinct or not from the surrounding shields; a supraocular present or absent; a temporal shield. Tail more or less compressed; caudal scales smooth or feebly multicarinate; terminal scute simple, compressed and pointed. Scales in 15 rows.

Both Procter and Wall in their discussion of *Brachyophidium* appear to have overlooked the fact that the character of the terminal scute had been already recognized by Beddome.

Key to the Species.

A supraocular and a temporal shield *sanguineus*, p. 69.
No supraocular shield *rhodogaster*, p. 70.

27. *Teretrurus sanguineus*.

Plectrurus sanguineus Beddome, 1867, Madras Quart. J. Med. So. p. 14, fig. (Anamallays; London), and J. Soc. Bibliog. Nat. Hist. London, 1940, i, p. 315, fig. (reprint).—*Teretrurus sanguineus*

- Beddome Ann. Mag Nat Hist (5) xvi 1886 p 28.—*Platyplectrurus sanguineus* Boulenger F B 1 1890 p 274, and Cat. Sn. Brit Mus 1, 1893 p 166, Ferguson, J Bombay N H 8 x 1893 p 71; Wall ibid. xix, 1923 p 360
Platyplectrurus leucostoma Beddome 1876 1 Z S p 701 (Wynaad; London)
Plecturus scabriscuda, Theobald, 1876 Cat Rept Brit Ind. p 136 (Anaimallays type lost)
Tetrurus tenebricosus Beddome 1896 Ann. Mag Nat Hist (5) vii, p 29 (Travancore; London)

Snout obtusely rounded, portion of the rostral visible from above not longer than the distance between it and the prefrontal frontal much longer than broad as long as the parietals a supraocular, a postocular, and a temporal shield, eye more than half the length of the ocular shield V 120-150, nearly twice as broad as the adjacent scales, C 5-9 Tail compressed, caudal scales smooth or feebly bi or tricarinate in the female all the caudals and last ventrals more or less distinctly multicarinate in the males, terminal acute simple, compressed smooth or with minute tubercles ending in a single point

Total length 230 diameter 9 mm

Brown or purplish red above, belly red, uniform or spotted or blotched with black

Range S India Wynaad, Anaimalai Hills Travancore, 3 000-7 400 feet

28 *Tetrurus rhodogaster*.

- Brachyophidium rhodogaster* Wall, 1921 J Bombay N H 8 xxviii, p 41 (Palni Hills London) and xxviii 1924 p 536 and xix, 1923, pp 332 & 392 and Ann. Mag Nat Hist (9) xiv 1924, p 200; Procter ibid (9) xiv 1924, p 140

Snout subacuminate, portion of the rostral visible from above less than the distance between it and the prefrontals, which are much longer than the nasals, frontal much longer than broad, longer than the parietals, supraocular and postocular united into a single shield, a temporal shield, eye half the length of the ocular shield V 139-145, twice as broad as the adjacent scales C 7-10 Tail compressed, upper caudal scales smooth or feebly bi or tricarinate, terminal acute simple, compressed ending in a point

Blackish brown above ventrals and outer row of scales whitish (red in life)

Total length 210 diameter 7 mm

Range S India Palni Hills

Genus PLECTRURUS.

Plectrurus Dumeril, 1851, Cat. Coll. Rept. p. 224; Dum. & Bibr.,

Érp. Gén. vii, 1854, p. 166 (type *perroteti*).

Maudia Gray, 1858, P. Z. S. p. 261 (no type given).

Plecturina Gray, I. c. s. p. 265.

Pseudoplectrurus Boulenger, 1890, F. B. I. p. 270 (type *canaricus*).

No mental groove. Eye not distinct from the surrounding shields; a supraocular present or absent; no temporal shield. Tail compressed; caudal scales keeled; terminal scute compressed, with two superposed, simple bifid or trifid points. Scales in 15 rows.

Key to the Species.

I. A separate supraocular shield.

A. Terminal scute ending in two simple points *perroteti*, p. 71.

B. Terminal scute ending in two bi- or tricuspid transverse ridges.

Reddish-purple above, uniform *guentheri*, p. 72.

Golden above, with black spots or narrow cross-bars *aurcus*, p. 72.

II. Supraocular shield united with the ocular. *canaricus*, p. 72.

29. *Plectrurus perroteti*.

Plectrurus perroteti Dum. & Bibr., 1854, Érp. Gén. p. 167, pl. lix, fig. 4 (Nilgiris; Paris); Günther, Rept. Brit. Ind. 1864, p. 193; Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 25; Boulenger, F. B. I. 1890, p. 271, and Cat. Sn. Brit. Mus. i, 1893, p. 161; Wall, J. Bombay N. H. S. xxvi, 1919, p. 558, and xxix, 1923, p. 359; Roux, Rev. Suisse Zool. xxxv, 1928, p. 442.

Plectrurus davidsoni Beddome, 1886, Ann. Mag. Nat. Hist. (5) xvii, p. 25 (Anamallays; London); Boulenger, F. B. I. 1890, p. 271, and Cat. Sn. Brit. Mus. i, 1893, p. 162.

Snout obtusely pointed; portion of rostral visible from above shorter than the distance between it and the frontal; frontal much longer than broad, as long as the parietals; supraocular small, twice as long as broad; eye half, or a little less than half, the length of the ocular shield. V. 152-180, one and a half times as broad as the adjacent scales; C. 6-12. Tail compressed, the scales multicarinate; terminal scute compressed, tuberculate and ending in two simple superposed points.

Brown or dark purplish-brown, paler below than above, uniform or each scale with a reddish or yellowish centre; young usually with a yellow line on the tail above.

Total length: 440, diameter 11 mm.

Range. S. India. Nilgiris, Anaïmalai Hills. Common in the Nilgiris between 4,500 and 6,000 feet. Viviparous, producing from 3-6 young at a time. They are born in July and August.

30 *Plectrurus guentheri*

Plectrurus guentheri Beddome, 1863, P Z S p 228, pl xxvii (Walaghat W Nilgiris London); Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886 p 26. Boulenger, F B I 1890, p 271, and Cat. Sn. Brit. Mus. 1893 p 162; Wall, J Bombay N H S xxix, 1923 p 369

Head shields as in *perroteti*, eye half the length of the ocular shield V 171-175 one and a third to one and a half times as broad as the adjacent scales, C 10-12 Tail as in *perroteti*, but the terminal acute with two superposed bi- or tricuspid transverse ridges

Bright reddish purple above, this colour descending as triangular markings on the sides, which, like the belly, are yellow the triangular markings may extend across the belly

Total length 375, diameter 9 mm

Range S India Sispara Ghat on the Western side of the Nilgiri Hills

31 *Plectrurus aureus*

Plectrurus aureus Beddome, 1860, P Z S p 182 (Chambra Hill; London) and Ann. Mag. Nat. Hist. (5) xvii, 1886, p 26. Boulenger F B I 1890 p 272 and Cat. Sn. Brit. Mus. I, 1893, p 162 Wall, J Bombay N H S xxix, 1923, p 360.

Like *guentheri* in morphological characters but the colour pattern quite different V 164-177, C 8-12

Golden above, lighter below, the dorsal scales, except the outer one or two rows, edged with violet The back is



Fig. 22—Side view of tail of *Plectrurus aureus*

marked with narrow, irregular violet-black cross bars, which may be reduced to a few scattered spots, belly much ornamented by violet black cross-bars or alternating spots

Total length 400, diameter 9 mm

Range Chambra Hill, Malabar

32 *Plectrurus canarius*

Silybura canarius Beddome, 1870 Madras Month. J. Med. Sci. p 170 (Kudra Makh nr Mangalore, London)—*Plectrurus canarius* Günther, P Z S 1875, p 229, Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p 27—*Pseudoplectrurus canarius*, Boulenger F B I, 1890, p 270 and Cat. Sn. Brit. Mus. I, 1893 p 160, Wall, J Bombay N H S xxix, 1923 p 359

Snout obtusely pointed; portion of rostral visible from above shorter than the distance between it and the frontal; frontal much longer than broad, as long as or longer than the parietals; no supraocular, the eye completely surrounded by the ocular shield, one-third its length. V. 172-188, not twice as broad as the adjacent scales; C. 6-13. Tail compressed, the scales smooth or feebly multicarinate; terminal scute ending in two, single or bifid, superposed points.

Brownish-violet, each scale usually paler in the centre; with or without small yellow spots on the back; lips yellow. Some yellow blotches on each side of the anterior part of the body: lower surface of tail yellow, with or without a black median streak; a light vertebral line on the tail often present.

Total length: 430, diameter 10 mm.

Range. S. India. S. Canara, Mysore, 6,000 feet.

Genus UROPELTIS.

Uropeltis (in part) Cuvier, 1829, Règne Anim. 2nd ed. ii, p. 76;

Fitzinger, Syst. Rept. 1843, p. 24 (type *ceylanicus*).

Siluboura Gray, 1845, Cat. Liz. Brit. Mus. p. 142 (type *elliotti*).—

Silybura, Boulenger, F. B. I. 1890, p. 257, and Cat. Sn. Brit. Mus. i, 1893, p. 144.

Coloburus Dumeril, 1851, Cat. Coll. Rept. p. 224 (type *ceylanicus*).

Crealia Gray, 1858, P. Z. S. p. 264 (type *melanogaster*).

Eye in the ocular shield; no supraocular, no temporal; no mental groove. Tail cylindrical or obliquely truncate, the terminal scute ending in two points side by side or simply a transverse ridge.

Key to the Species.

- I. Tail obliquely truncate above, the truncated portion small, feebly convex, never quite flat, the scales covering it more or less thickened and multicarinate.

Scales in 17 rows.

- A. Portion of rostral visible from above equal to the distance between it and the middle of the frontal.

V. 144-176. Brown with small yellow spots below *elliotti*, p. 75.

V. 184-195. Black, with large yellow spots below *nitidus*, p. 76.

V. 185-234. Brown, usually with transverso series of yellow, black-edged ocelli. *ocellatus*, p. 76.

- B. Rostral ridged above, the part visible longer than the distance between it and the middle of the frontal.

V. 155-168. Belly brown with yellow spots *dindigalensis*, p. 77.

V. 180-188. Rostral as long as the distance between it and the parietals *beddomei*, p. 78.

V. 203-213. Rostral as long as the distance between it and the hinder end of the parietals [p. 78. *macrorhynchus*,

Scales in 19 rows

- A lateral series of large yellow spots often extending across the belly wood masoni, p. 79
- II Tail obliquely truncate above the truncated portion large flat or concave forming a circumscribed disc, covered with thickened be tri or multicarinate scales

Scales in 13 rows

V 127-140

macrolepis p. 79

Scales in 17 rows

- A Portion of rostral visible from above not or not much longer than its distance from the frontal
- V 119-146 Belly yellowish, or brown or yellow and brown erylanicus p. 80
- V 127-128 146-157 Belly yellowish, with large black or brown blotches or cross bars archiceps, p. 81.
- V 127-136 3 to 6 large red spots on each side of the body in front, and 2 more on the tail [p. 81. rubromaculatus.
- V 165-172 A broad yellow (red) stripe along each side of the body retrolinatus, p. 82.
- B. Portion of rostral visible from above distinctly longer than its distance from the frontal.
- V 138-157 A yellow streak along each side of the body in front phipseni, p. 83.
- V 139-156 Yellowish below with dark spots or cross bars nylendron, p. 83.

Scales in 19 rows

Rostral much produced posteriorly, almost separating the nasals

broughmani, p. 83.

- III Tail more or less compressed, distinctly rounded above the upper scales keeled or smooth (fig 25, p. 86)

Scales in 17 rows.

- A. Rostral not completely separating the nasals, snout obtuse
- V 164-165 Black with large red spots on the side of the neck and tail maculatus, p. 83.
- V 161-180 Brown with small yellow spots below and on the sides pterni, p. 84.
- V 174-188 Purplish brown with transverse series of yellow black-edged ocelli. liura, p. 84.
- B Rostral completely separating the nasals, snout pointed.
- V 161-180 Belly brown with yellow spots or cross bars, or all yellow pulneyensis, p. 85.
- V 141-166 A lateral yellow stripe, belly black melanogaster, p. 86.
- V 197-210 Rostral as long as the distance between it and the hinder end of the frontal philippii, p. 87.

Scales in 19 rows.

Rostral usually not separating the nasals grandis, p. 85.

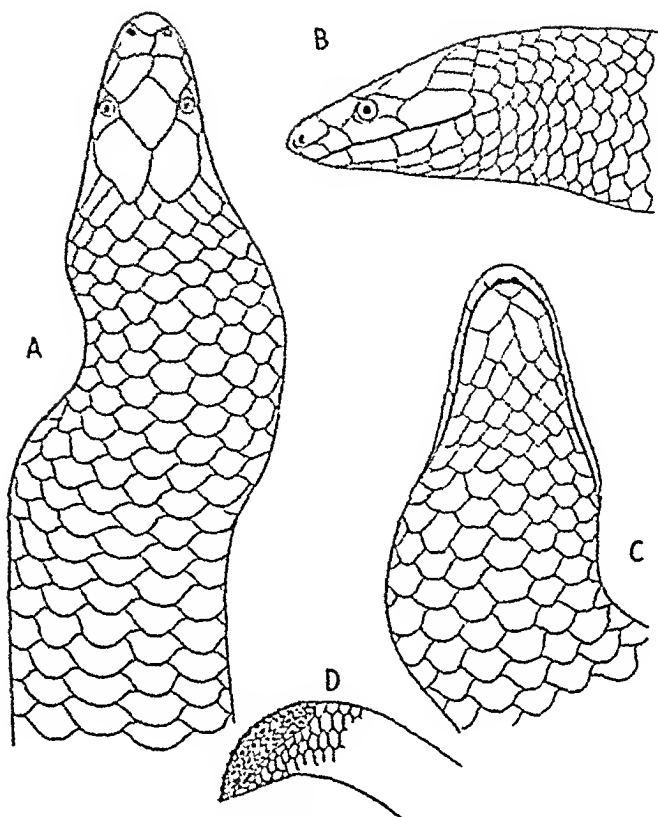


Fig. 23.—*Uropeltis ceylonicus*. (B.M. 74.4.29.86-87). A. Dorsal, B. Lateral, and C. Ventral view of head. D. Three-quarter view of tail.

33. *Uropeltis ellioti*.

Siluboura ceylonicus (not of Cuvier) Gray, 1845, Cat. Liz. Brit. Mus. p. 142 (Madras: London).

Siloboura ellioti Gray, 1858, P. Z. S. p. 262, fig.—*Silybura ellioti*, Peters, Serp. Fam. Uropelt. 1861, p. 21; Günther, P. Z. S. 1875, p. 228; Boulenger, F. B. I. 1890, p. 265, and Cat. Sn. Brit. Mus. i, 1893, p. 154; Wall, J. Bombay N. H. S. xxix, 1923, p. 357; Beddome (in part), Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 20.

Snout acutely pointed; portion of rostral visible from above as long as the distance between it and the middle of the frontal, separating the nasals for more than half their length; eye one-third to half the length of the ocular shield. Scales

in 17 rows V 144-176 on and a half times as broad as the adjacent scales C 5-11 Tail obliquely truncate, the truncated portion not perfectly flat the disc well-defined covered with thick but not multicarinate scales, terminal scute large depressed with small tubercles above ending in a transverse ridge with two points

Dark brown uniform or with small yellow spots above and larger ones below a more or less distinct yellow line on each side of the neck a yellow stripe on each side of the tail connected with its belly by a transverse bar across the anal region

Total length 250 diameter 7 mm

Range Hills of Peninsular India Western Ghats south of the Goa Gap to Tinnevely Eastern Ghats (Shevaroy's Coimbatore district S Arcot Jalapet Vizagapatam district, Canjam)

34 *Uropeltis nitidus*

Silybura nitida Beddome 1883 P Z S p 154 (Anamallays, London) and Ann. Mag. Nat. Hist. (5) xvii, 1886 p 19; Boulenger F B I 1890 p 263 and Cat. Sn. Brit. Mus. 4, 1893 p 151 Wall. J. Bombay N H S xxix 1923 p 357

Snout acutely pointed portion of rostral visible from above as long as the distance between it and the middle of the frontal, separating the nasals for more than half their length, eye less than half the length of the ocular shield Scales in 17 rows, V 184-195 on and a third times as broad as the adjacent scales C 5-11 End of tail slightly flattened above without well defined disc the terminal scales strongly multicarinate, terminal scute as in *ellioti*

Black with distant large yellow spots below, which usually alternate but sometimes meet to form cross-bars

Total length 340 diameter 10 mm

Range Anaimalais Hills (Cochin side) 4 000-5 000 feet

35 *Uropeltis ocellatus*

Silybura ocellata Beddome 1883 P Z S p 225 (Waja Ghat Nilgiris, London) and Madras J. Med. Sc. vi 1863 p 46 fig. 1 Günther Rept. Brit. Ind. 1864 p 190 pl. xvi, fig. F Beddome, Ann. Mag. Nat. Hist. (5) xvii 1886 p 17 Boulenger F B I 1890 p 262 and Cat. Sn. Brit. Mus. 4, 1893 p 150; Ferguson, J. Bombay N H S x 1878 p 70 Wall. ibid. xiv 1918, p 632, col. pl. and xvi, p 657 and xxix 1923 p 357
Silybura ochracea Beddome 1878, P Z S p 801 and Ann. Mag. Nat. Hist. (5) xvii, 1886 p 17 (Anaimalais, London)
Silybura dupesi Beddome 1878 P Z S p 801 (Nelampati, Anaimalais, London)

Snout acutely pointed portion of rostral visible from

above as long as the distance between it and the middle of the frontal, separating the nasals for more than half their length; eye one-fifth to one-third the length of the ocular shield. Scales in 17 rows; V. 185-234, one and a half times as broad as the adjacent scales; C. 6-11. Tail as in *nitidus*.

Yellowish or brown above, almost uniform or with trans-

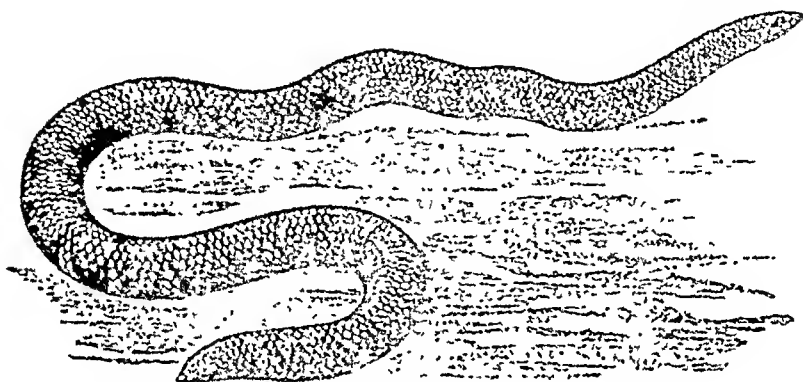


Fig. 24.—*Uropeltis ocellatus*. (After Boulenger, F.B.I. 1890).

verse series of small, yellow, black-edged ocelli; belly brown with large yellow spots or cross-bars, or yellow mottled or blotched with brown.

Total length: 530, diameter 15 mm.

Range. Western Ghats south of the Goa Gap; common in the Nilgiri and Anaimalai Hills.

Viviparous, producing from 3 to 5 young at a time.

36. *Uropeltis dindigalensis*.

Silybura dindigalensis Beddome, 1877, P. Z. S. p. 167 (Sirumallays, near Dindigal; London), and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 13; Boulenger, F.B.I. 1890, p. 264, and Cat. Sn. Brit. Mus. i, 1893, p. 152; Wall, J. Bombay N. H. S. xxix, 1923, p. 357.

Snout acutely pointed; portion of rostral visible from above longer than the distance between it and the middle of the frontal, separating the nasals for more than half their length; eye one-third the length of the ocular shield. Scales in 17 rows; V. 155-168, one and a half times as broad as the adjacent scales; C. 5-10. Tail as in *elliotti*.

Dirty yellowish above, the scales more or less thickly speckled with brown, or with brown spots; belly dark brown, with yellow spots or irregular cross-bars; a yellow streak on

the lips continued along each side of the neck tall yellow below with a large brown spot behind the vent

Total length 3.0 diameter 12 mm

Range S India Anaimalai Hills Madurai district 4 000 5 000 feet

37 *Uropeltis beddomi*

Silybura beddomi Günther 1862 Ann. Mag. Nat. Hist. (3) ix. p. 56 (Anaimalai Hills London) and Rept. Brit. Ind. 1864 p. 190 pl. xvii fig. F Boulenger F. B. L. 1890 p. 265 and Cat. Sn. Brit. Mus. 1. 1893 p. 153 Wall. J. Bombay N. H. S. xxix. 1923 p. 357

Silybura ellioti (in part) Beddome 1886 Ann. Mag. Nat. Hist. (5) xvii. p. 20

Snout acutely pointed portion of rostral visible from above as long as the distance between it and the posterior extremity of the frontal shield separating the nasals for more than half their length eye one third the length of the ocular shield. Scales in 17 rows V 180-188 one and a third times as broad as the adjacent scales C 6-7 Tail as in *ellioti*.

Brown above the median 6 or 8 dorsal scale rows with minute yellow spots these are on the sides of the scales and form more or less distinct longitudinal lines lower parts lighter brown with yellowish spots which are confined to the posterior margins of the scales a yellow streak on each side of the neck a yellow bar across the anal region.

Total length 250 diameter 7 mm.

Range S India Anaimalai Hills

38 *Uropeltis macrorhynchos*

Silybura macrorhynchos Beddome, 1877 P. Z. S. p. 167 (above Ponnachi London) and Ann. Mag. Nat. Hist. (5) xvii. 1886 p. 19 Boulenger F. B. L. 1890 p. 264 and Cat. Sn. Brit. Mus. 1. 1893 p. 153; Wall. J. Bombay N. H. S. xxix. 1923 p. 357; Roux, Rev. Suisse Zool. xxiv. 1918 p. 441

Snout acutely pointed, rostral strongly ridged above strongly projecting the portion visible from above as long as the distance between it and the end of the parietals separating the nasals for more than half their length, eye one-fourth to one third the length of the ocular shield Scales in 17 rows V 203-213 one and a third times as broad as the adjacent scales C 6 Tail as in *ellioti*.

Upper parts uniform brown lower parts brown and yellow the latter colour confined to the posterior half of the scale, a yellow streak from the mouth along each side of the neck another on each side of the lower surface of the tail connected with its fellow by a cross-bar on the anal region

Total length 740 diameter 13 mm

Range S India Anaimalai Hills 3 000-4 000 feet.

39. *Uropeltis wood-masoni*.

Silybura melanogaster (not of Gray) Günther, 1875, P. Z. S. p. 227, pl. xxxi, fig. A (Palni Hills; London).

Silybura wood-masoni Theobald, 1876, Cat. Rept. Brit. Ind. p. 135 (Palni Hills; Calcutta).

Silybura nigra Beddome, 178, P. Z. S. p. 154, and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 12 (Palni Hills; London); Boulenger, F. B. I. 1890, p. 263, and Cat. Sn. Brit. Mus. i, 1893, p. 151; Wall, J. Bombay, N. H. S. xxix, 1923, pp. 359 and 388.

Snout acutely pointed; portion of rostral visible from above as long as or longer than the distance between it and the middle of the frontal, sometimes completely separating the nasals; eye one-third to one-half the length of the ocular shield. Scales in 19 rows; V. 166-183, one and a half times as broad as the adjacent scales; C. 6-11. Tail as in *nitidus*.

Black, brown or dark violet above, uniform or with transverse series of small, round, yellow spots or ocelli; a lateral series of large irregular bright yellow spots often extending across the belly; or the belly entirely black.

Total length: 270; diameter 10 mm.

Range. S. India. Anaimalai and Palni Hills, Travancore, Tinnevely; one example from the Nilgiris.

Wall (1923) states that it is the commonest snake in the Palni Hills above 6,000 feet.

Silybura wood-masoni has been referred to the synonymy of *pulneyensis*. The type, however, is still in existence and in good condition: it is an undoubted example of the snake usually called *nigra*.

40. *Uropeltis macrolepis*.

Silybura macrolepis Peters, 1861, Serp. Fam. Uropelt. p. 904 (type loc. unknown; London); Günther, Rept. Brit. Ind. 1864, p. 189, pl. xvii, fig. B; Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 24; Boulenger, F. B. I. 1890, p. 269, and Cat. Sn. Brit. Mus. i, 1893, p. 159; Wall, J. Bombay Nat. Hist. Soc. xix, 1909, p. 756, and xxix, 1923, p. 356; McCann, ibid. xxix, 1924, p. 1062, fig.

Snout rounded; portion of rostral visible from above distinctly less than its distance from the frontal; eye usually more than half the length of the ocular shield. Scales in 15 rows; V. 128-140, one and a half times as broad as the adjacent scales; C. 7-10. End of tail obliquely truncate above, the truncated portion flat or concave, covered with thickened bi- or tricarinate scales, forming a disc; one and a half to two times as long as broad; terminal caudal scute large, depressed with small spines above, ending in a transverse ridge with two points.

Black or dark purplish-brown, each scale with a light margin; a short, broad, yellow or orange stripe on the lips

and sides of the neck continued as large spots on the anterior part of the body and sometimes as smaller ones throughout its whole length a broad yellow or orange stripe on each side of the tail A specimen in the British Museum locality unknown has a broad orange stripe occupying three scale-rows along each flank throughout the whole body

Total length 300 diameter 12 mm

Range Bombay Hills between lat 18° 7' and 19° 7' N

Very common in Mahaleshwar during the rains according to McLann (1924)

41 *Uropeltis ceylanicus*

Uropeltis ceylanicus Cuvier 1829 Reg Anim 2nd ed i p 76 (Ceylon Paris) — *Coloburus ceylanicus* Dum & Bibr

Hist Nat Rept v i 1854 p 164 pl lux fig 3 — *Silybura*

ceylanica Günther P Z S 1876 p 228

Silybura brevis Günther 1860 Ann Mag Nat Hist (3) ix p 56, and Rept Brit Ind 1864 p 192 pl xvii fig D (Anamalais, London) Boulenger F B I 1890 p 268, and Cat Rept Brit Mus i 1893 p 158 Ferguson, J Bombay N H S x, 1875 p 70 Wall. ibid xvi 1919 p 558 and xxix 1923, p 338 text-figs

Silybura shortii Beddome, 1863 P Z S p 225 pl xxv fig 1 (Shevaroy Hills London) Günther Rept Brit Ind. 1864, p 191 pl xxv fig G

Silybura nilgherrensis Beddome, 1863 P Z S p 226 pl xxvi, fig 1 and Ann. Mag Nat Hist (3) xvii 1896 p 14 (Nilgiris, 7000 feet London)

Silybura bioculata Günther 1864 Rept Brit Ind p 191 pl xvii fig H (Deccan London)

Silybura nilgherrensis var *annulata* Beddome, 1896 Ann Mag Nat Hist (5) xvii, p 15 (Wynnad Malabar London)

Snout obtusely pointed portion of rostral visible from above distinctly less than its distance from the frontal eye usually more than half the length of the ocular shield Scales in 17 rows V 119-146 and one a half times as broad as the adjacent scales C 8-12 Tail as in *macrolepis*

Brownish or blackish above uniform or with yellowish spots transversely arranged (*shortii*) or with a yellow lateral stripe (*bioculata*) belly yellowish with or without dark brown or black spots or entirely brown or black lower surface of tail brown or black in the middle yellow on the side Var *annulata* is brown above yellowish below with narrow dark brown annuli

Total length 455 diameter 15 mm

Range S India The Western Ghats from Castle Rock to Travancore Shevaroy's Beddome's specimen said to have come from Ganjam district is probably incorrectly labelled as regards locality

The commonest species in the Travancore Hills.

42. *Uropeltis arcticeps*.

Silybura arcticeps Günther, 1876, P. Z. S. p. 229, fig. (Tinnevely Hills; London); Boulenger, F. B. I. 1890, p. 268, and Cat. Sn. Brit. Mus. i, 1893, p. 157; Wall, J. Bombay N. H. S. xxix, 1923, p. 358.—*Silybura nilgherriensis* var. *arcticeps* Beddome, 1886, Ann. Mag. Nat. Hist. (5) xvii, p. 16.

Silybura madurensis Beddome, 1878, P. Z. S. p. 802 (Cumbum Hills, Madura; London), and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 16; Boulenger, F. B. I. 1890, p. 267, and Cat. Sn. Brit. Mus. i, 1893, p. 156; Ferguson, J. Bombay N. H. S. x, 1895, p. 70; Wall, *ibid.* xxix, 1923, p. 358.

Silybura nilgherriensis var. *picta* Beddome, 1886, Ann. Mag. Nat. Hist. (5) xvii, p. 16 (near Pirmede, N. Travancore; London).

Snout obtusely pointed; portion of rostral visible from above equal to or a little less than its distance from the frontal; eye one-half to one-fourth the length of the ocular shield. Scales in 17 rows. V. 127–128, 146–157, nearly twice as broad as the adjacent scales; C. 8–10. Tail as in *macrolepis*.

Black or dark purplish-brown above, uniform or the scales edged with yellowish, or the colours reversed, or yellowish spotted with black; yellow (orange) below, with large black blotches or cross-bars, or almost entirely black or purplish-brown.

Total length: 370, diameter 11 mm.

Range. S. India. The Western Ghats south of Palghat; from sea-level (Alleppey) to about 5,000 feet in the Travancore Hills; Tinnevely Hills.

Variety *arcticeps* is known from two specimens only; they are from the Tinnevely Hills and their ventral count is 127–128. The ventral count of 12 examples of *madurensis* from the Travancore Hills ranges from 146–157. Except for this difference I can find no character by which to separate them.

43. *Uropeltis rubromaculatus*.

Silybura rubromaculata Beddome, 1867, Madras Quart. J. Med. Sci. xi, p. 15, fig., and J. Soc. Bibl. Nat. Hist. i, 1940, p. 316 (reprint) (Anamallays; London), and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 14; Boulenger, F. B. I. 1890, p. 268, and Cat. Sn. Brit. Mus. i, 1893, p. 157; Wall, J. Bombay N. H. S. xxix, 1923, p. 358.

Snout obtusely pointed; portion of rostral visible from above equal to its distance from the frontal; eye equal to or more than half the length of the ocular shield. Scales in 17 rows; V. 127–136, one and a half times as broad as the adjacent scales; C. 7–10. Tail as in *macrolepis*.

Dark brown above the hinder part of each scale dull yellow or yellowish-brown, or the two colours in almost equal pro-

portions the same below but the yellow colour predominating from 3 to 6 large blood red spots on each side of the neck and fore part of the body and one on each side of the tail near the vent.

Total length 380 diameter 12 mm

Range S India Anaimalai and Nilgiri Hills 4000-5000 feet.

44 *Uropeltis rubrolineatus*

Silybura rubrolineata Günther 1875 P. Z. S. p. 218 (Travancore Hills London) Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886 p. 14. Boulenger Fauna Brit. Ind. 1890 p. 288 and Cat. Sn. Brit. Mus. i, 1893 p. 163; Ferguson, J. Bombay N. H. S. x, 1895 p. 70. Wall, ibid. xlix, 1923 p. 358.

Snout obtusely pointed portion of rostral visible from above a little longer than its distance from the frontal, diameter of eye not half the length of the ocular shield. Scales in 17 rows V 163-172 one and two-thirds times as broad as the adjacent scales C 6-8 Tail as in *macrolepis*.

Blackish brown with a yellowish (bright red in life) stripe along each side of the body and tail occupying the greater part of scale rows 1, 2 and 3 ventrals with irregular spots of the same colour.

Total length 400 diameter 12 mm

Range India Western Ghats south of the Palghat Gap Anaimalai and Travancore Hills

45 *Uropeltis philponti*

Silybura ellioti (in part) Günther 1864, Rept. Brit. Ind. p. 190; Beddome Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 20. *Silybura philponti* Mason, 1883, Ann. Mag. Nat. Hist. (6) i, p. 184 (Bombay Ghats London) Boulenger Fauna Brit. Ind. 1890, p. 288 and Cat. Sn. Brit. Mus. i, 1893 p. 155; Wall, J. Bombay N. H. S. xlix, 1923 p. 357.

Snout obtusely pointed portion of rostral visible from above distinctly longer than its distance from the frontal eye half the length of the ocular shield. Scales in 17 rows, V 133-157 one and a half times as broad as the adjacent scales C 7-12 Tail as in *macrolepis*.

Brown or purplish brown uniform or with yellowish dots above a more or less distinct yellow streak along each side of the neck and fore part of the body a yellow stripe on each side of the tail connected with its fellow by a transverse bar across the anal region.

Total length 280 diameter 9 mm.

Range India The Western Ghats from the Bombay Hills to the Anaimalai Hills

46. *Uropeltis myhendræ*.

Silybura nilgherriensis var. *myhendræ* Beddome, 1886, Ann. Mag. Nat. Hist. (5) xvii, p. 15 (Myhendra Mt., S. Travancore; London).—*Silybura myhendræ*, Boulenger, F. B. I. 1890, p. 267, and Cat. Sn. Brit. Mus. i, 1893, p. 156; Ferguson, J. Bombay N. H. S. x, 1895, p. 70; Wall, ibid. xxix, 1923, p. 358.

In general scalation similar to *phipsoni*. V. 139–156; C. 6–8.

Dark purplish-brown above, each scale with a crescentic yellowish posterior border; the yellow colour on the scales may increase in extent and form more or less distinct transverse cross-bars, at any rate on the anterior part of the body; lower parts yellowish, more or less thickly spotted or barred with brown or black; the dark coloration of the back may be continued round the body as annuli.

Total length: 540, diameter 17 mm.

Range. S. India. Western Ghats south of the Goa gap; Nilgiris, Travancore, 2,000–4,000 feet.

47. *Uropeltis broughami*.

Silybura broughami Beddome, 1878, P. Z. S. p. 800 (Sirumallays, Madura Dist.; London), and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 11; Boulenger, F. B. I. 1890, p. 264, and Cat. Sn. Brit. Mus. i, 1893, p. 152; Wall, J. Bombay N. H. S. xxix, 1923, p. 359; Roux, Rev. Suisse Zool. xxxv, 1928, p. 441.

Silybura levingii Beddome, 1878, P. Z. S. p. 801 (Palni Hills, 4000 ft.; London).

Snout acutely pointed; rostral much produced both anteriorly and posteriorly, ridged above, the part visible equal to the distance between it and the hinder end of the frontal, separating the nasals for more than half their length; eye not half the length of the ocular shield. Scales in 19 rows; V. 195–230 (181 Roux), one and a half times as broad as the adjacent scales; C. 7–10. Tail as in *matrolepis*.

Brown above with more or less distinct transverse series of small, yellow, black-edged ocelli; sides with large, irregular, yellow spots; ventrals dark brown.

Total length: 410, diameter 11 mm.

Range. The Palni and Sirumalai Hills, Madura district; Nilgiris.

48. *Uropeltis maculatus*.

Silybura maculata Beddome, 1878, P. Z. S. p. 154 (Anamallays; London), and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 22; Boulenger, F. B. I. 1890, p. 261, and Cat. Sn. Brit. Mus. i, 1893, p. 149; Ferguson, J. Bombay N. H. S. x, 1895, p. 70; Wall, ibid. xxix, 1923, p. 356.

Snout obtusely pointed; portion of rostral visible from

above equal to its distance from the frontal or a little longer; nasals in contact with one another, eye half the length of the ocular shield or a little less. Scales in 17 rows, V 154-165, one and a half times as broad as the adjacent scales, C 8-13. Tail compressed rounded above, slightly swollen, the terminal scales above smooth or feebly keeled, terminal acute with minute tubercles above ending in a transverse ridge with two points.

Dark brown or black above black below, the ventrals and adjacent caudals with light margins. a series of orange (red in life) blotches along the side of the neck and fore part of the body and also along the hinder part of the body and tail.

Total length 390, diameter 11 mm

Range S India Anaimalai and Travancore Hills, 6 000-7,000 feet

49 *Uropeltis petersi*

Silybura petersi Beddome 1878 P Z S p 164 (Anamallays: London) and Ann Mag Nat Hist (5) xvi 1896 p 22, Boulenger F B I 1890 p 261 and Cat Sn Brit Mus. L 1893 p 148. Wall, J Bombay N H. S xxix, 1923 p 358

Snout obtusely pointed. portion of rostral visible from above shorter than its distance from the frontal; nasals in contact with one another, eye one third the length of the ocular shield. Scales in 17 rows V 151-180 one and a half times as broad as the adjacent scales, C 8-11. Tail compressed, slightly swollen rounded above, the terminal scales feebly or strongly multicarinate, terminal acute ending in a horizontal ridge.

Brown with or without yellowish dots above belly with small irregular yellow spots, no yellow band on the side of the tail.

Total length 190 diameter 6 mm

Range Anaimalai Hills, 4 000-5 000 feet

50 *Uropeltis hura*

Silybura hura Gunther 1875 P Z S p 228 pl. xxxi, fig B (Madura Hills London); Beddome, Ann. Mag Nat Hist (5) xvi, 1896 p 18. Boulenger F B I 1890, p 262, and Cat Sn. Brit Mus L 1893 p 149. Wall, J Bombay N H. S xxx, 1923 p 366

Snout acutely pointed, portion of rostral visible from above as long as its distance from the frontal, nasals in contact with one another, eye not quite half the length of the ocular shield. Scales in 17 rows, V 174-188 one and a half times as broad as the adjacent scales, C 8-12. Tail slightly compressed, rounded above, terminal caudal scales multicarinate, terminal acute ending in a transverse ridge with two points.

Purplish-brown above, each scale edged with darker, and with transverse series of small yellow, black-edged ocelli; sides and lower parts with large, alternating black and yellow spots or cross-bars.

Total length : 320, diameter 9 mm.

Range. Madura and Tinnevely Hills, 3,000–5,000 feet.

51. *Uropeltis pulneyensis*.

Plectrurus pulneyensis Beddome, 1863, P. Z. S. p. 228, col. pl. xxv, fig. 2 (Palni Hills; London & Calcutta).—*Rhinophis pulneyensis*, Günther, Rept. Brit. Ind. 1864, p. 187, pl. xvii, fig. C.—*Silybura pulneyensis*, Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 23; Boulenger, F. B. I. 1890, p. 260, and Cat. Sn. Brit. Mus. i, 1893, p. 147; Roux, Rev. Suisse Zool. xxxv, 1928, p. 441; Wall, J. Bombay N. H. S. xxix, 1923, pp. 356, 392.
Silybura guentheri Beddome, 1878, P. Z. S. p. 801, and Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 23.

Snout acutely pointed; portion of rostral visible from above as long as the distance between it and the middle of the frontal, completely separating the nasals; eye one-half to one-third the length of the ocular shield. Scales in 17 rows; V. 161–180 (154 Roux), one and a half times as broad as the adjacent scales; C. 6–13. Tail slightly compressed, rounded above, the terminal scales above feebly multicarinate, terminal scute ending in 2 points.

Dark brown or blackish above, with or without minute specks; a yellow lateral stripe anteriorly; belly with large yellow spots, usually alternating, or cross-bars. The type of *guentheri* has the lower parts entirely yellow.

Total length : 380, diameter 12 mm.

Range. Palni and Travancore Hills, Madura district 5,000–7,000 feet.

Beddome states (1886) that it is common in the Palni Hills, Madura district (5,000–7,000 feet), particularly on the higher ranges where it is very abundant; it is often found about the roads in wet weather, or dug up in gardens; it is also found under rocks.

52. *Uropeltis grandis*.

Rhinophis grandis Beddome, 1867, Madras Quart. J. Med. Sci. xi, p. 15, fig., and J. Soc. Bibl. Nat. Hist. i, 1940, p. 316 (reprint) (Anamallays; London).—*Silybura grandis*, Günther, Ann. Mag. Nat. Hist. (4) i, 1868, p. 3; Beddome, *ibid.* (5) xvii, 1886, p. ii; Boulenger, F. B. I. 1890, p. 261, and Cat. Sn. Brit. Mus. i, 1893, p. 148; Wall, J. Bombay N. H. S. xxix, 1923, p. 359.

Snout pointed; rostral sometimes separating the nasals, the portion visible above equal to the distance between it and the middle of the frontal; eye one third the length of the ocular

shield. Scales in 19 rows, V 198-218, one and a half times as broad as the adjacent scales, C 6-12. Tail feebly compressed, rounded above, preanal and caudal scales multicarinate in the male, terminal scute ending in two points.

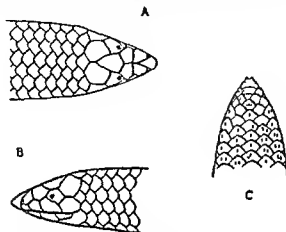


Fig 25 —*Uropeltis grandis*

A. Dorsal B. Lateral view of head. C. Dorsal view of tail.

Dark violet, belly with large alternating yellow spots or cross-bars.

Total length 470, diameter 12 mm.

Range Anaimalai Hills, 4,000-4,700 feet.

53 *Uropeltis melanogaster*

Mytilus (Orealia) melanogaster Gray, 1858, P Z. B. p. 264, fig. (Ceylon, London). — *Ramophis melanogaster*, Peters, Berp. Fam. Uropelt. 1864 p. 16 pl. h, fig. 4. — *Silybura melanogaster*, Boddone Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 20; Boulenger, P. B. I. 1890 p. 260, and Cat. Sn. Brit. Mus. i, 1893, p. 146; Wall, Sn. Ceylon, 1921, p. 79, and J. Bombay N. H. S. xxix, 1923, p. 356.

Snout acutely pointed, portion of rostral visible from above as long as the distance between it and beyond the middle of the frontal, completely separating the nasals; eye not half the length of the ocular shield. Scales in 17 rows, V 141-166, not much broader than the adjacent shields, C 6-10. Tail feebly compressed, rounded above, slightly swollen, terminal scales above smooth or feebly keeled, terminal scute higher than broad, spinose, ending in a horizontal ridge or with two points.

Dark brown, with yellow spots confluent and forming an irregular lateral stripe; sometimes the belly is spotted with yellow.

Juveniles are yellowish above, each scale with a large brown centre; lower parts entirely yellow.

Total length: 250, diameter 8 mm.

Range. Ceylon. Hills of the Central Province.

54. *Uropeltis phillipsi*.

Silybura phillipsi Nicholls, 1929, Ceylon J. Sci. B, xv, p. 153, and Ceylon J. Sci. D, ii, 1929, p. 97 (Meniakanda Group, E. Matala Hills, Ceylon; London).

Snout acutely pointed; portion of rostral visible above as long as the distance between it and the hinder end of the frontal, completely separating the nasals; eye one-third the length of the ocular shield. Scales in 17 rows; V. 197-210; not much broader than the adjacent scales; C. 6-9. Tail as in *melanogaster*.

Dark bluish-grey, each scale of the 7 median dorsal rows with a yellow centre forming longitudinal lines down the back; a lateral series of yellow blotches or vertical bars.

Total length: 230, diameter 7 mm.

Range. Ceylon. Known only from the type-locality and Mouskandy Hills, Gammadura.

Genus RHINOPHIS.

Rhinophis Hemprich, 1820, Grundr. Naturg. p. 119 (type *oxyrhynchus*), in J. Wagler's, Nat. Syst. Amph. 1830, p. 195; Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 5; Boulenger, F. B. I. 1890, p. 254, and Cat. Sn. Brit. Mus. i, 1893, p. 140.

Dapatnaya Kelaart, 1853, Prodr. Fauna Zeyl. ii, p. 16 (type *lanka-divana*).

Mytilia Gray, 1858, P. Z. S. p. 57 (type *gerrardi*).

Morina Gray, 1858, P. Z. S. on pp. 260 and 264 appears to be a clerical error for *Mytilia*.

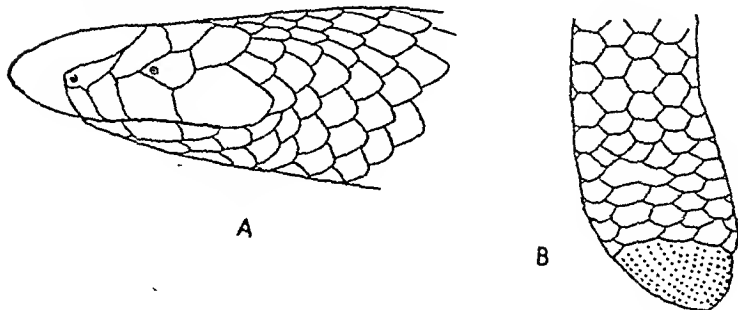


Fig. 26.—*Rhinophis oxyrhynchus*.
A. Side view of head. B. Side view of tail.

Eye in the ocular shield no temporal, no mental groove
Tail cylindrical terminating in a flatish or convex round or oval mucous shield

In all the species the snout is acutely pointed and compressed the rostral shield extending forwards as well beyond the mouth and backwards separating the nasal shields and partly the prefrontals

Key to the Species

- I Caudal disc shorter than the shielded part of the head rostral separating the nasals; scales in 17 rows
 Ventrals 143-189
 Ventrals 172-191
Nyctis, p. 28
drummondiae [p. 89]
- II Caudal disc as long as or longer than the shielded part of the head rostral separating the nasals
 A Rostral not more than half as long as the shielded part of the head scales in 15-17 rows
 a Disc convex
 Scales in 15 rows
 Scales in 17 rows
 V 180-204 Belly speckled with black and white; sides with large yellow spots
ambigua [p. 89]
- V 180 Belly white with large black spots; no lateral spots
homolepis, [p. 90]
- V 180 Belly white with large black spots; no lateral spots
hypomelas, [p. 90]
- V 153-182 Uniform brown above and below
phalacrodermus [p. 91]
- A Disc flat
 Scales in 17 rows
macronotus, [p. 91]
- B Rostral more than half as long as the shielded part of the head, scales in 17-19 rows
 V 238-246 (291) A black vertebral line between two light ones
punctatus [p. 92]
- V 211-227 Uniform brown above and below
acrythymelus [p. 92]
- V 238 A broad orange vertebral stripe with large black blotches
 [See appendix *dormitorulosa*]

53 *Rhinophis blythi*

Rhinophis blythi Kelaart, 1853, Prodr. Faun. Zeyl. 4, p. 14 (Ceylon), *Peters* Synp. Faun. Uropekt. 1861, p. 17, *Beddome*, Ann. Mag. Nat. Hist. (6) xvii 1896, p. 8, *Schlegel* F. N. L. 1890, p. 238 and *Cat. Sa. Hist. Mus.* 1, 1893, p. 144. *Wall*, Zool. Ceylon, 1921, p. 42, and *J. Herpetology* N. H. S. xix, 1923, p. 255 — *Rhinophis blythi* (in part), *Günther* Rept. Brit. Ind. 1864, p. 186.
Nyctis blythi Gray 1833, P. Z. S. p. 283 (Ceylon, London)

Rostral not ridged above not separating the prefrontals for more than half their length the portion visible as long

as the distance between it and the hinder part of the frontal ; frontal as long as or longer than the parietals ; eye less than half the length of the ocular shield. Scales in 17 rows. V. 148-168, a little broader than the adjacent scales ; C. 5-9.

Caudal disc convex, one-half to three-fifths as long as the shielded part of the head, hardly visible from below, covered with minute tubercles or spicules ; some of the caudal scales with faint keels.

Dark brown, each scale below with a yellow spot or margin ; a series of yellow vertical spots on each side of the fore part of the body, usually connected by a lateral stripe which may extend the whole length of the body ; a yellow ring round the base of the tail.

Total length : 370, diameter 12 mm.

Range. Ceylon. Hills of the Central, Uva and Southern Provinces.

56. *Rhinophis drummondhayi*.

Rhinophis drummondhayi Wall, 1921, Sn. Ceylon, p. 43, and J. Bombay N. H. S. xxix, 1923, p. 356 (Uva Patnas, Ceylon ; London).

In scalation similar to *R. blythi*. V. 173-191 ; C. 4-8.

Brown above, uniform or each scale dappled with whitish or with a light margin ; below the same, but the white more extensive ; a series of light spots or vertical bars along each side of the body present or absent ; a more or less complete light ring round the base of the tail.

Total length : 300, diameter 9 mm.

Range. Ceylon. Hills of Central and Uva Provinces.

57. *Rhinophis sanguineus*.

Rhinophis sanguineus Beddome, 1863, P. Z. S. p. 227 (Cherambody, Malabar ; London) ; Günther, Rept. Brit. Ind. 1864, p. 186, pl. xvii, fig. A ; Beddome, Ann. Mag. Nat. Hist. (5) 1886, xvii, p. 8 ; Boulenger, F. B. I. 1890, p. 256, and Cat. Sn. Brit. Mus. i, 1893, p. 143 ; Ferguson, J. Bombay N. H. S. x, 1890, p. 70 ; Wall, ibid. xxvi, 1919, p. 557, and xxix, 1923, p. 355 ; fig. tail.

Rhinophis microlepis Beddome, 1863, P. Z. S. p. 227, pl. xxvi, fig. 2 (Wynaad ; London).

Rostral not ridged above, not separating the prefrontals for half their length, the portion visible as long as the distance between it and the hinder part of the frontal ; frontal as long as the parietals ; eye one-third the length of the ocular shield. Scales in 15 rows ; V. 182-218, one and a third times as broad as the adjacent scales ; C. 5-10. Caudal disc convex, longer than the shielded part of the head, covered with spicules or

fine striae, caudal scales smooth above; caudal and preanal scales below multicarinate in the male

Bluish black above, with or without small light spots, belly and outer 3-4 scale-rows bright red, more or less thickly spotted with black, tail red below, the middle part usually black.

Total length 400 diameter 10 mm

Range Mysore (Koppa, Kalsea), Wynad, Nilgiris, Travancore, Tinnevely

Wall states that it is common in the Nilgiris; the young are born in July, August and September (1919)

58 *Rhinophis homolepis*.

Rhinophis homolepis Hemprich 1829 *Grund Naturg.* p. 119;
Peters Serp. Faun. Uropelt. 1831 p. 14, col. pl. ii, fig. 2 (Ceylon);
Dopatschke reptiliens Kalaart. 1853, *Prodr. Faun. Zeyl.* ii, p. 17
 and *Cat. Sn. Brit. Mus.* 2, 1893, p. 142; *Wall. Sn. Ceylon.* 1921,
 p. 23, and *J. Bombay N. H. S.* xix, 1923, p. 355—
Rhinophis macleayensis Boulenger, *Ann. Mag. Nat. Hist.* (5) xvii,
 1896 p. 7, Boulenger, *F. B.* 1, 1890, p. 256,
Myndus fowleri Gray, 1858, *F. Z. S.* pp. 58 & 263, pl. xiii (Ceylon;
 London)

Rostral obtusely ridged above, not separating the prefrontals for more than half their length, the portion visible as long as the distance between it and the hinder end of the frontal or a little longer, frontal as long as the parietals; eye one-third to one-fourth the length of the ocular shield. Scales in 17 rows V 180-204, a little broader than the adjacent scales, C 3-5. Caudal disc convex, as long as or longer than the shielded part of the head, well visible from below, covered with spicules arranged in longitudinal series

Blackish brown each scale of the back with a fine margin of yellow, those on the belly with a broader one, a series of triangular yellow spots along each side of the body

Total length 280, diameter 8 mm.

Range Ceylon. Hills of the Central, Uva and Sabaragamuwa Provinces

Hemprich's *homolepis* has been very clearly figured by Peters, and this name which has priority, should be used.

59 *Rhinophis fergusonianus*.

Rhinophis fergusonianus Boulenger, 1896, *J. Bombay, N. H. S.* x, p. 236 (Cardamon Hills, Travancore, London), and *Cat. Sn. Brit. Mus.* iii, 1896 p. 596. *Ferguson, J. Bombay N. H. S.* x, 1870, p. 70, *Wall, ibid.* xix, 1923, p. 354.

Closely allied to *homolepis*, differing as follows—

Caudal disc considerably longer than the shielded part

of the head, scarcely visible from below, covered with fine striæ. V. 180.

Black above, with some fine white dots; sides white, dotted and spotted with black; belly white with large black spots more or less confluent and forming a zig-zag; caudal disc black, edged all round with yellow.

Total length: 320, diameter 7 mm.

Known only from the type-specimen.

60. *Rhinophis philippinus*.

Typhlops philippinus Cuvier, 1829, Règne. Anim. 2nd ed. ii, p. 74 ("Philippines").—*Rhinophis philippinus*, Müller, Zeitschr. f. Physiol. iv, 1832, p. 248; Dum. & Bibr. Hist. Nat. Rept. 1854, vii, p. 154, pl. lix, fig. 1; Peters, Serp. Fam. Uropelt. 1861, p. 15; Gunther, Rept. Brit. Ind. 1864, p. 184.

Rhinophis planiceps Peters, 1861, Serp. Fam. Uropelt. p. 17, pl. i, fig. 1; Beddome, Ann. Mag. Nat. Hist. (5) xvii, 1886, p. 6; Boulenger, F. B. I. 1890, p. 255, and Cat. Sn. Brit. Mus. i, 1893, p. 141; Wall, Sn. Ceylon, 1921, p. 36, and J. Bombay N. H. S. xxix, 1923, p. 355.

Like *homolepis* but with fewer ventrals and a different coloration. V. 153–182; C. 3–6.

Uniform brown, each scale with a lighter margin, sometimes a yellowish blotch near the head or on the anal region.

Total length: 280, diameter 9 mm.

Range. Ceylon. Hills in the Central and Sabaragamuwa Provinces.

61. *Rhinophis travancoricus*.

Rhinophis travancoricus Boulenger, 1892, J. Bombay N. H. S. vii, p. 318, pl., and Cat. Sn. Brit. Mus. i, 1893, p. 143 (Travancore; London); Wall, J. Bombay N. H. S. xxix, 1923, p. 355.

Rostral not ridged above, separating the prefrontals for half their length, or a little more or less, the portion visible as long as the distance between it and the hinder part of the frontal; frontal as long as the parietals; eye one-third the length of the ocular shield. Scales in 17 rows; V. 132–146, one and a half times as broad as the adjacent scales; C. 5–7; caudal disc as long as the shielded part of the head, almost flat, covered with spicules.

Dark purplish-brown, the scales on the sides and belly edged with whitish; on the throat and fore part of the belly almost completely whitish; anal region black; lower surface of tail yellow.

Total length: 180, diameter 7 mm.

Range. Travancore (Trivandrum, Pirmed, Ernakulam). Found at sea level and in the hills to about 4,000 feet.

62 *Rhinophis punctatus*

Rhinophis punctatus Möller 1832 Zetschr Physiol iv, p 248 (Ceylon) Peters Serp Fam Uropelt 1861, p 12, col. pl ii, fig 3 Beddome Ann Mag Nat Hist (5) xvii, 1886, p 6. Boulenger, F B I 1890 p 255 and Cat Sn. Brit Mus i, 1893 p 141 Willey Spol Zeyl i, 1903 p 89, fig 1 Wall. Sn Ceylon 1921 p 33 and J Bombay N H S xxix, 1923, p 355

Rhinophis porrectus Wall 1921, Sn Ceylon p 35, and J Bombay N H S xxix 1923 p 355 (Maradankadawala, between Chillaw and Puttalam N W Province, London)

Rostral strongly ridged above, separating the prefrontals for more than half their length, the portion visible more than half the length of the shielded part of the head, frontals shorter than the parietals eye one third to one fifth the length of the ocular shield Scales in 17 rows, V 236-246 (281) not or scarcely broader than the adjacent scales, C 7-9, caudal disc convex, as long as the shielded part of the head, covered with minute spines or tubercles

Yellowish each scale with a large central black spot, except the two series on either side of the vertebral line, sides and lower surface of tail yellow, except for a median black stripe

Total length 380, diameter 8 mm

Range Ceylon Hills in the Central Province (Kandy, Peradeniya), N W Province

I am unable to find any character by which to separate Wall's *porrectus* from *punctatus* except that it has more ventral shields viz 281 *RA punctatus* however, is known at present from only a few specimens, and more material will no doubt show that its variation is considerably greater than 236-246

63 *Rhinophis oxyrhynchus*

Typolope oxyrhynchus Schneider, 1801, Hist Amph ii, p 341 (Ceylon) — *Rhinophis oxyrhynchus*, Hemprich, Grundr Naturg 1820 p 119 Peters Serp Fam Uropelt 1861 p 9 pl ii, fig 1, Gunther Rept Brit Ind 1854, p 184 Beddome Ann Mag Nat Hist (5) 1886, p 5 Boulenger F B I 1890 p 255, and Cat Sn Brit Mus i, 1893, p 141 Wall, Spol Zeylan 1921, p 397, and Sn Ceylon, 1921, p 32 and J Bombay N H S xxix 1923 p 356

Dopainaya lankadivana Kelaart 1853 Prodr Faun Zeyl ii, p 16 *Nyctia unimaculata* Gray, 1859 P Z S p 264 fig (Ceylon, London)

Rostral strongly ridged above, separating the prefrontals for more than half their length, the portion visible more than half the length of the shielded part of the head, frontal as long as the parietals, eye one third to one fourth the length of the ocular shield Scales in 17 or 19 rows, V 211-227, scarcely broader than the adjacent scales, C 5-7, tail as in *punctatus*

Uniform brown, each scale with a lighter margin; anal region yellow and sometimes a yellow spot below the tail; of stouter proportions than *punctatus*.

Total length: 400, diameter 10 mm.

Range. Ceylon (the low country in the Northern Province, Mullaitivu; Vavoniya).

Genus PSEUDOTYPHLOPS.

Pseudo-typhlops (in part) Schlegel, 1839, Abbild. Amphib. p. 40 (type by elimination *philippinus*).

Uropeltis, Boulenger, 1890, F. B. I. p. 253, and Cat. Sn. Brit. Mus. i, 1893, p. 139, and other authors.

Eye in the ocular shield; no temporal; no mental groove. Tail cylindrical, swollen at the end, obliquely truncate above, with a large, subcircular, spinose shield. Scales in 19 rows.

64. *Pseudotyphlops philippinus*.

Uropeltis philippinus Cuvier, 1829, Reg. Anim. 2nd ed. ii, p. 76 ("Philippines": Paris); Dum. & Bibr. Hist. Nat. Rept. vii, 1854, p. 161, pl. lix, fig. 2; Peters, Serp. Fam. Uropelt. 1861, p. 20.—*Pseudo-typhlops philippinus*, Schlegel, Abbild. Amph. 1839, p. 40.

Uropeltis grandis Kelaart, 1853, Prodr. Fauna Zeyl. ii, p. 15; (Kerinday, near Matura, S. Prov., Ceylon: London); Günther, Rept. Brit. Ind. 1864, p. 188; Beddome, Ann. Mag. Nat. Hist. (5), xvii, 1886, p. 9; Boulenger, F. B. I. 1890, p. 254, and Cat. Sn. Brit. Mus. i, 1893, p. 139; Green, Spol. Zeyl. 1906, p. 220; Wall, Sn. Ceylon, 1921, p. 26, and J. Bombay N. H. S. xxix, 1923, p. 354.

Uropeltis saffragamus Kelaart, 1853, Prodr. Fauna Zeyl. ii, p. 16 (Katnapoora, near Adam's Peak, Ceylon).

Uropeltis pardalis Kelaart, 1853, Prodr. Faun. Zeyl. ii, p. 16; Gray, P. Z. S. 1858, p. 263. (Matura, Ceylon: London.)

Rostral obtusely ridged above, separating the nasals for half or more than half their length, the portion visible as long

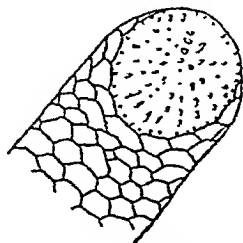


Fig. 27.—Dorsal view of tail of *Pseudotyphlops philippinus*.

as the distance between it and the middle of the frontal or a little longer; frontal as long as or a little longer than the parietals; eye one-third the length of the ocular shield.

V 129-147, scarcely broader than the adjacent scales; C 6-9
Tail obliquely truncate above the truncated portion expanded
and carrying a flat, subcircular shield, as long as or longer
than the shielded part of the head, covered with coarse spines

Dark brown or blackish above, the young with yellow
spots yellow beneath, the young with dark brown spots

Total length 285 diameter 22 mm The largest species
of the family

Range Ceylon at low elevations (Trincomalee, Matara,
Kolonne, Kotte, Badulla)

Family ANILIDÆ.

Hyndus Boulenger, 1899 P B I p 249, and Cat Sn. Brit Mus.
4, 1893, p 131

Bones of the skull solidly united, prefrontal in contact
with the nasal, supratemporal intercalated in the cranial
wall, quadrate very short, vertically placed, dentary firmly
attached to the articular, a coronoid bone, premaxillary
teeth present or absent Ventrals of pelvis and hind limbs,
terminating in a claw like spur on each side of the vent.
Hypapophyses absent throughout the vertebral column

Range Three genera are known, two in the Oriental
Region, the third, *Anilus*, in tropical S America.

Genus CYLINDROPHIS.

Pipe Snakes

Cylindrophis Wagler, 1828 Icon. Amphib p 5 and Syst. Amphib
1830 p 195 (type *resplendens*), Boulenger P B. I 1890, p 249
and Cat Sn. Brit Mus 4, 1893 p 134. Wall, Sn. Ceylon, 1921,
p 18. Mahendra, Proc Ind. Acad. Sci. iv, 1936, p 230 and v.
1937, p 109

Teeth robust, subequal, 9 to 12 in each maxilla, none
in the premaxilla Head small, not distinct from neck,
with large symmetrical shields; eye small, with rounded
or vertically subelliptic pupil, nostril in the nasal shield
which is in contact with its fellow behind the rostral, no loreal
or preocular, a mental groove Body stout, cylindrical,
of almost equal diameter throughout, scales smooth, in
19 to 23 rows, ventrals feebly enlarged. Tail very short

The hemipenis, owing to the extreme shortness of the tail,
is difficult to examine satisfactorily In *C. rufus* it is short
and thick and is furnished with a series of long convoluted
folds through which the undivided sulcus winds (when seen
in the organ at rest), there are no spines

Range. Ceylon; the Indo-Chinese region; the East Indies. Seven species are known; two inhabit the area covered by this work.

Key to the Species.

Breadth of frontal equal to or greater than half the distance between the centres of the eyes; rostral narrow, as high as broad; back uniform dark brown, or with light cross-bars *rufus*, p. 96.

Breadth of frontal not half the distance between the centres of the eyes; rostral broader than high; back with a black network enclosing large light spots *maculatus*, p. 98

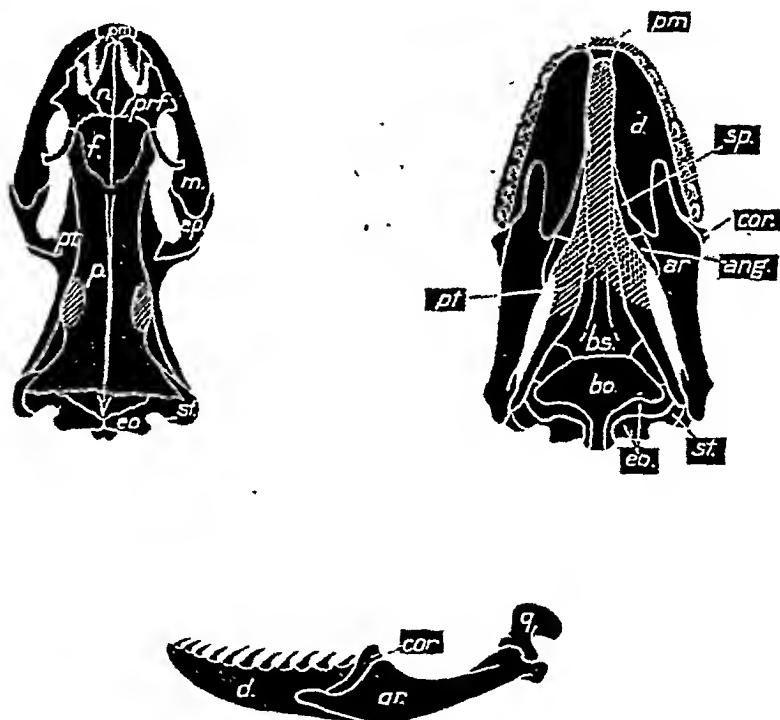


Fig. 28.—Skull of *Cylindrophis rufus*. A. Dorsal view. The quadrate and mandible have been removed. B. Ventral view. C. Left mandible, outer view.

ang., angular; ar., articular; bo., basioccipital; bs., basisphenoid; cor., coronoid; d., dentary; eo., exoccipital; ep., ectopterygoid (or transpalatine); f., frontal; m., maxilla; n., nasal; p., parietal; pm., premaxilla; prf., prefrontal; pt., pterygoid; q., quadrate; sp., splenial; st., supraoccipital.

65 *Cylindrophis rufus*

THE RED TAILED PIPE SNAKE

- Anguis rufa* Laurent 1768 Syn Rept p 71 (Surnam) —
Tortrix rufa Schlegel Phys Serp 1837 II p 9 figs 1-3 and
 Abbid Amphib 1844 p 111 col pl xxxi, figs 11 17 (Java) —
Cylindrophis rufa Gray Zool Misc 1842 p 46 — *Cylindrophis*
rufus Boulenger F B I 1890 p 250 fig and Cat Sn. Brit
 Mus 1893 p 135 Flower P Z S 1893 col pl xxvii.
 Wall J Bombay N H S xxx 1903 p 354 Smith J Nat
 Hs Soc Siam 1914 p 10; Schmidt Copern. 1913, p 80;
 Haas Zool Jahrb Jena (Anat.) 1 v 1931 (3) p 411 fig skull
 Bourret Serp Indo Chine 1936 p 24 Radovanovic Zetischr
 Naturw Jena 1937 p 700 (fig skull)
Anguis scythica non Linn.) Russell 1891 Ind Serp II, pp 31 & 32.
 pls xxvii and xxviii (Java Tranquebar)
Cylindrophis rerpandens Wagler 1836 Icon. Amphib p 5 col
 pl v fig 1 (Java)

Laurentie description Corpore aequali ruffo lineis transversalibus elbis interruptis abdomine vario does not bear much resemblance to the snake under discussion and he may have meant something quite different Schlegel appears to have been the first author to describe it properly and his coloured figure leaves one in no doubt as to what species he meant

Head depressed snout broadly rounded rostral about as broad as high breadth of the frontal equal to or greater than half the distance between the centres of the eyes (less than half in two examples from Burma), supraocular about as large as the frontal larger than the parietals six supraorbitals 3rd and 4th largest and touching the eye three infralabials in contact with the anterior genials posterior genials small or absent Ventrals scarcely broader than the adjacent scales anal divided

Two races can be distinguished

I *Cylindrophis rufus rufus*

19 or 21 scales round the body (21 for specimens from the Indo Chinese Region) V 188 216 C 5-7

Dark brown or black above highly iridescent with or without narrow light cross bars usually alternating with one another and extending only to the middle of the back dark brown or black below with broader white (reddish or orange in life) cross bars which are complete or alternate with one another on the mid line Tail below red or orange except the extreme tip

Total length 865 tail 15 mm.

Range Siam and French Indo-China S of lat 17° N the Malay Peninsula and Archipelago

II. *Cylindrophis rufus burmanus*, subsp. nov.

19 scales round the body. V. 201-225; C. 5-7.

Colour as in *rufus rufus* but the belly more heavily marked with dark brown and the cross-bars less evident; sometimes almost entirely dark brown.

Size much smaller.

Total length: 330, tail 10 mm.

Range. Tenasserim and Burma as far North as Myitkyina.

Cylindrophis rufus is a fairly common snake in the great central plain of Siam, living in the rice fields, or in gardens

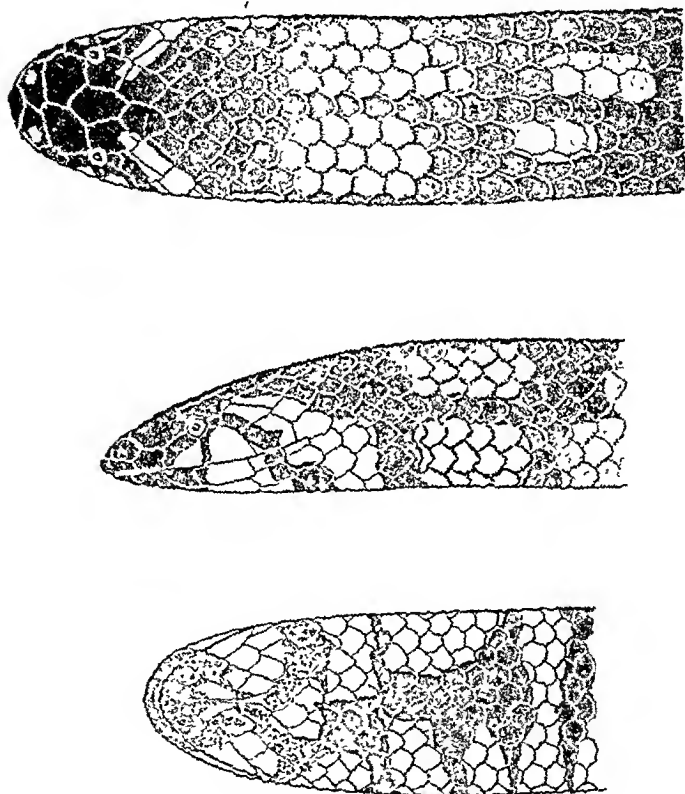


Fig. 29.—*Cylindrophis maculatus*. (B.M. 1905.3.25.76-81.)

in the vicinity of houses. In soft earth it can burrow easily and when not in search of food lives in the ground. It takes readily to water. Its food consists of other snakes and eels and the manner in which it can dispose of a meal even longer

than itself is astonishing. I have never known one to bite when handled, but when alarmed it flattens the whole body and curls the tail up over its back showing the reddish under surface. Schmidt (1923) records a specimen taken in a salt water lagoon near Hué Annam.

66 *Cylindrophis maculatus*

CEYLON PIPE SNAKE.

Anguier maculatus Latr. 1754 Mus. Ad. Frol. p. 21 pl. xxi, fig. 3 ("America") and Esch. Nat. 2, 10th edn. 1758, p. 223; Russell. Ind. Serp. ii, 1801 p. 2* pl. xxix ("Tranquebar"); Boulenger P. B. I. 1890 p. 251 and Cat. Sn. Brit. Mus. 4, 1893 p. 126; Wall. J. Bombay N. H. 6. xvi. 1919 p. 862, and xxix. 1923 p. 254 and Sn. Ceylon, 1921 p. 12.

Eye smaller than in *rufus*. frontal narrower, its breadth less than half the distance between the centres of the eyes, usually smaller than the supraoculars, rostral broader. Scales in 19 or 21 rows, V 185-212 C 4-6.

Above with a black network enclosing two series of large reddish brown spots. lower parts white variegated with black or barred with black and white.

Total length 600 tail 18 mm.

Range Ceylon. Found in the plains and in the hills at low altitude. A common snake.

Two or three young are produced at a time. They are unusually large measuring from 127 to 137 mm in length when born. Wall states that it is a very placid snake making no attempt to escape when captured. It lives beneath the soil.

Family XENOPELTIDÆ.

Xenopeltis Cope, 1854, Proc. Acad. Philad. p. 230; Boulenger. P. B. I. 1890 p. 278 and Cat. Sn. Brit. Mus. 4, 1893, p. 147.

Bones of the skull united, premaxillate toothed, in contact with the maxilla, ectopterygoid loosely attached to the maxilla; prefrontal in contact with the nasal. no postfrontal, supra-temporal intercalated in the cranial wall extending posteriorly beyond it, suspending the quadrate which is very short and vertically placed, dentary attached to the articular anteriorly, entirely free behind, no coronoid bone. Hypapophyses absent in the posterior part of the vertebral column.

A single genus.

Xenopeltis has several unique characters. In addition to the occipital shield and loss of the postfrontal bone, the auditory bones are different from those of any other snake that I

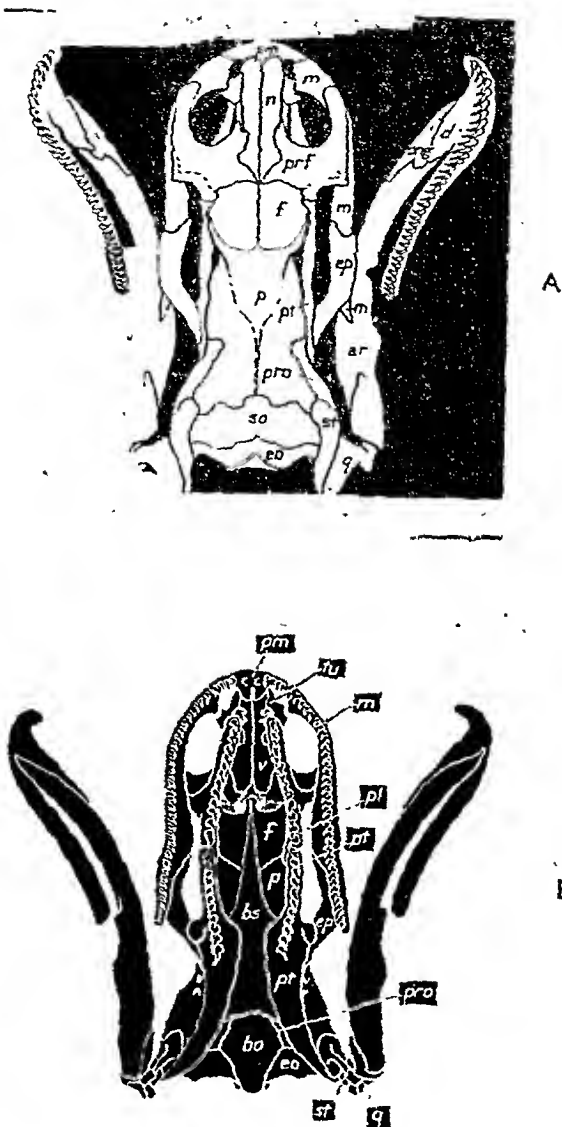


Fig. 30.—Skull of *Xenopeltis unicolor*. A. Dorsal, B. Ventral view.
 ang., angular; ar., articular; bo., basioccipital; bp., basisphenoid;
 ca., columella auris; d., dentary; co., exoccipital; ep., ecto-
 pterygoid (or transpalatine); f., frontal; fp., foot-plate;

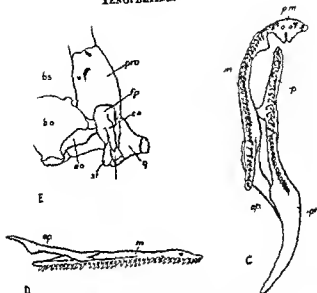


Fig 30 (cont).—C Maxilla and palatimaxillary arch. D Maxillary ectopterygoid articulation. E Ear bones

i intercalary bone m, maxilla; n, nasal p parietal pm premaxilla; prf, prefrontal pro prootic q quadrate so supraoccipital st supratemporal; v vomer

know except *Cylindrophis rufus* in which the condition is much the same. The fenestra ovalis and foot-plate which fits into it are unusually large and the columella auris is short and stout. Its attachment to the quadrate is through another small rod of bone of about the same size which is intercalated between them (fig E)

Genus XENOPELTIS

Xenopeltis Reinhardt in Bo = 1871 *Ims* p 564 (type *unicolor*); Boulenger F B I 1890 p 276 and Cat Sn Brit Mus I 1893 p 167 Radovanovic Zeitschr Naturw Jena, lxxi, 1937 p 204 (skull)

Teeth small equal closely set and strongly curved with edged crowns directed outwards 4 or 5 on each side in the premaxilla 35 to 45 in each maxilla. Eye small with vertically elliptic pupil. Head not distinct from neck covered with large shields including a large occipital in contact with the frontal and a large preocular no loreal. A mental groove. Body cylindrical scales smooth in 15 rows through out ventrals well developed tail short subcaudals paired

67. *Xenopeltis unicolor*.

SUNBEAM SNAKE.

Xenopeltis unicolor Reinwardt in Boie, 1827, Isis, p. 564 (Java); Theobald, Cat. Rept. Mus. Asiat. Soc. Bengal, 1868, p. 64; Boulenger, F. B. I. 1890, p. 276, fig., and Cat. Sn. Brit. Mus. i, 1893, p. 108; Flower, P. Z. S. 1899, p. 657; Wall, J. Bombay N. H. S. xix, 1900, p. 292, col. pl., and xxix, 1923, p. 361, and xxx, 1925, p. 806; Thompson, P. Z. S. 1913, p. 415; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 12; Pope, Rept. China, 1935, p. 77, pl. v; Bourret, Serp. Indo-Chine, 1936, p. 27, fig.; Mahendran, Curr. Sci. Bangalore, vi, 1938, p. 559, fig.

Xenopeltis concolor Reinwardt, in Boie, 1827, Isis, p. 564 (Java).

Xenopeltis leucocephala Reinwardt, l. c. s, p. 564 (Java).

Tortrix xenopeltis Schlegel, 1837, Phys. Serp. ii, p. 20, pl. i, figs. 8-10, and Abbild. 1844, pl. xxxv (subst. name).

Head much depressed, snout rounded; nostril between two small nasals. Rostral broader than high, well visible from above; internasals much smaller than the prefrontals;

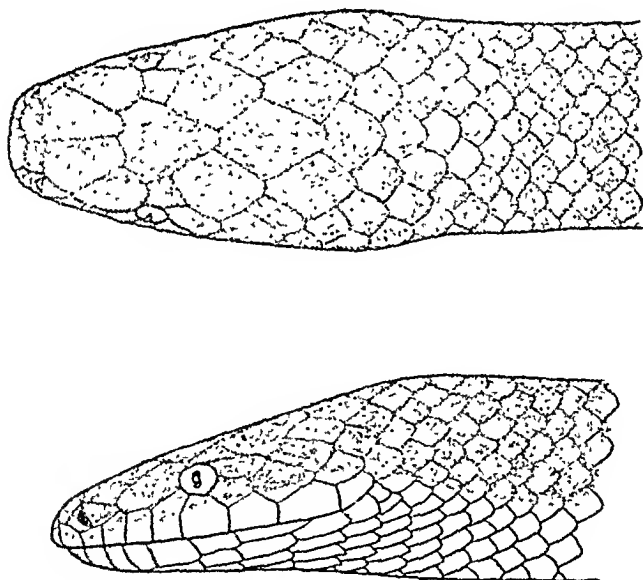


Fig. 31.—*Xenopeltis unicolor*. (B.M. 1925.5.25.6-7.)

frontal large; supraoculars very small; interparietal about as large as the parietals; usually a pair of enlarged shields vis-a-vis the latter behind the interparietal; a large preocular extending well on to the upper surface of the head; 2 large postoculars indistinguishable in shape from the temporal shields; 8 supralabials, first in contact with the internasal

in front of the nasal 4th and 5th touching the eye; a pair of small genials, in contact with the first 3 infralabials. Scales quite smooth highly polished V 173-196, for specimens from the Indo Chinese region, C 21-31

The hemipenis is forked near the tip, but the sulcus bifurcates about half way down it is longitudinally pleated throughout and in addition there are 4 or 5 transverse flicences, the distal half of the organ has some calyculate areas. There are no spines

Black to chocolate brown above, highly iridescent, the outer scale rows edged with white. Ventrals and outermost row of scales white, uniform or edged with brown; hinder part of head and neck white in the young

Total length ♀ 1050 tail 85, ♂ 850, tail 70 mm

Range. Burma as far north as Myitkyina, Siam, French Indo-China, the Malay Peninsula and Archipelago. Mehl records a specimen from Kwangtung Province, southern China, and Theobald one from the Andamans

The Iridescent Earth Snake or Sunbeam Snake, so called on account of the highly polished and iridescent nature of its scales, is common in southern Burma and Tenasserim, Siam and southern French Indo-China. It inhabits chiefly the rice-fields, and gardens in the vicinity of human habitations living in the earth or hiding beneath logs or stones. In soft earth it can bury itself rapidly, and those that I have kept in captivity spent their days bidden in this manner issuing forth only at night. I never knew one attempt to bite when handled, but when excited it could vibrate its short tail with extraordinary speed, so rapidly that at times I have believed I could hear the movement. Its food consists of other snakes, small rodents, and frogs, birds have also been recorded in its diet

Family BOIDÆ

Boidæ (in part) Gray, 1845 *Zool Misc* p 41. Boulenger F B L. 1890, p 234 and Cat Sn Brit Mus 1, 1893, p 71. Beddard, P Z S (2) 1904, p 107 and Ann Mag Nat Hist xii, 1904, p 213 (angiology). Ladow Amphib & Rept 1909, p 596, figs., Stull, Proc Boston Soc Nat Hist xl, 1935, p 357. Ros, Jena Z Naturw lxx 1935 p 1. Noble & Schmidt, Pr Amer Phil Soc Philad lxxvii 1937 p 837

Palato-maxillary arch movable, premaxillary teeth present or absent, pterygoid extending to the quadrate, prefrontal in contact with the nasal, supratemporal attached scale like to the cranium, supporting the quadrate, which is vertically placed, dentary firmly attached to the articular, a coronoid bone. Vestiges of pelvis and hind limbs, terminating in a claw like spur, usually visible on each side of the vent, they are longer in the male than in the female

Range. The tropical regions of the world.

The family has been divided into two subfamilies, the Boinæ and the Pythoninæ, on the presence or absence of a supraorbital bone. This character may serve as a useful means of recognition, but it is doubtful if it expresses phylogeny. The loss of the supraorbital bone has occurred, no doubt, independently in different genera, and its absence does not necessarily express relationship. *Constrictor* (Boinæ) for instance is in many ways more closely related to *Python* (Pythoninæ) than it is to *Eryx* (Boinæ).

Two genera are represented in the Oriental Region. They are easily distinguished from one another by the characters given on p. 105.

The Pythons and Boas are the largest representatives of the serpent family now living. Fossil remains show that at one time there were much larger forms. *Gigantophis* from the Eocene of Egypt is estimated to have reached 50 feet in length. Such dimensions are not attained by any species existing to-day. Authentic records, taken from individuals that have been measured after death, and not from dried and stretched skins, show that they do not exceed 28 or 30 feet or a little more. The rate of growth of *P. molurus* and *P. reticulatus* in the first three or four years of life has been recorded, and in spite of the size which these species attain, it does not differ greatly from the rate which governs the growth in many other snakes. Sexual maturity is reached in $2\frac{1}{2}$ or 3 years, and average length, that is 12 feet for *P. molurus* and 18 or 20 feet for *P. reticulatus*, in 5 or 6 years. Both species, however, are known to grow considerably larger, and it may be that the Boidæ differ from other snakes in continuing to grow throughout life. The very large individuals which were recorded 30, 40 and 50 years ago, are seldom met with to-day. The spread of population into districts previously untouched, makes it increasingly difficult for any snake of really large proportions to conceal itself safely.

The weight of a large Python is considerable. Wall records a *P. molurus* of 19 feet in length that weighed 200 lb., and a *P. reticulatus* of 28 feet, that scaled 250 lb.

The Pythons are oviparous and guard their eggs by coiling themselves around them during the incubation period. Observations on "brooding" mothers to ascertain if the temperature of the body is raised during this period, are conflicting. A very careful series of observations recorded by Benedict (1932), appears to show that the body temperature is raised between 2 and 4 degrees Centigrade during that time.

The vestigial hind limbs are used by the male during courtship to stimulate the female by scratching her on the body above the cloaca.

The Boidæ kill their prey by constriction. No bones are broken in the process, death being caused by asphyxiation.

The habit of constriction, however, is not confined to this family. It is shared by some of the Colubridæ, particularly the larger species of *Elaphe*, *Ptyas*, *Zaocys* and some species of *Boiga*.

The structure and function of the labial pits have been recently studied by Ros (1935) and Noble and A. Schmidt (1937). These cavities are richly supplied with blood-vessels and nerves, and experimental observations indicate that they act as accessory sense organs. In many respects they are analogous to the facial pits of the Crotalidæ.

Key to the Genera.

- A supraorbital bone; teeth on the premaxilla;
head with large shields; labials pitted..... *Python*, p. 105.
No supraorbital bone; no premaxillary teeth; head
covered with small shields; labials not pitted .. *Eryx*, p. 111.

Genus PYTHON.

PYTHON.

Python Daudin, 1803, Mag. Encycl. An. 8, March, p. 434, and Hist. Nat. Rept. v. 1803, p. 226 (type *molurus*); Boulenger, F. B. I. 1890, p. 245, and Cat. Sn. Brit. Mus. i, 1893, p. 80. Stull, Proc. Boston Soc. Nat. Hist. xl, 1935, p. 393.

Aspidoboa Sauvage, 1884, Bull. Soc. Phil. Paris, (7), viii, p. 143 (type *curta*).

Anterior maxillary and mandibular teeth very long. Head distinct from neck, with large symmetrical shields; rostral, anterior supralabials and anterior and posterior infralabials pitted. Eye with vertical pupil. Scales smooth, in 60-75 rows. Ventrals rather narrow; subcaudals generally paired. Hypapophyses absent in the posterior part of the vertebral column.

The hemipenis of *P. molurus* and of *P. reticulatus* is as follows:—It is forked for about half its length, the lips of the sulcus being very prominent; throughout the whole length there are longitudinal folds, and just proximal to the point of bifurcation of the sulcus there is a fleshy, tongue-shaped papilla; there are no spines.

Fig. 32.—Skull of *Python reticulatus*. A. Dorsal, B. Lateral, and C. Ventral view. The right palato-maxillary arch has been removed. D. Inner view of right mandible. E. Occipital region.
ang., angular; *ar.*, articular; *bo.*, basioccipital; *bp.*, basisphenoid; *ca.*, columella auris; *cor.*, coronoid; *d.*, dentary; *eo.*, exoccipital; *ep.*, ectopterygoid (or transpalatine); *f.*, frontal; *fm.*, foramen magnum; *m.*, maxilla; *n.*, nasal; *oc.*, occipital condyle; *p.*, parietal; *pl.*, palatine; *pm.*, premaxilla; *prf.*, prefrontal; *pro.*, prootic; *pt.*, pterygoid; *ptf.*, postfrontal; *q.*, quadrate; *so.*, supraoccipital; *sor.*, supraorbital; *sp.*, splenial; *st.*, supratemporal; *tu.*, turbinal (or septomaxilla); *v.*, vomer.

Range Africa the Oriental Region and East Indian Islands 7 species are known two inhabit the area covered by this work.

Key to the Species

Rostral and first two supralabials pitted & sized & 243-270

C 58-73

Rostral and first four supralabials & sized & 297

33° C 75-102

malurus, ♀ 106

[p 109

redicollatus

68 *Python molurus*

[INDIAN PYTHON ROCK PYTHON]

Russell, 1798 Int Serp. 2, pp 27 to 30 pls xxi to xxiv (Fedda Poda Ganjam and Vizagapatam) and p 44 pl 19 f Bora Calcutta

Coluber molurus Linn 1758 Syst Nat 101 ed p 323 (India) Anderson, B. N. Vet Acad Stockholm xxiv 4 8 1799 p 35 *Python molurus* Boulenger & D 1 1820 p 216 and Cat Sn. Brit Mus 4 1823 p 87 de Blotf Reps Indo-Austral Arch. 1817 n p 22 Wall J Bombay N H 8 xxi 1812 p 467 col pl, and xxx, 1813 p 35 and xxxi, 1826 p 659 and Sn. Ceylon, 1821 p 48 fig Lench J Bombay N H 8 xxxii, 1818 p 408 and Feld, 1826 Feb p 404 and Dec p 1856 Bourret Serp Indochine 1836 p 18; Fraser J Bombay N H 8 xxx x, 1837 p 463

Python cinereus Schneider 1801 Hist Amphib. 2, p 270 (based on Russell & Fedda Poda)

Python castaneus Schneider 1801 Hist Nat Rept. v p 226 (based on Russell & Fedda Poda)

Python albivans Schneider 1801 Hist Nat Rept. v p 226 (based on Russell & Fedda Poda)

Python orbiculatus Schneider 1801 Hist Nat Rept. v p 226 (based on Russell & Bora)

Coluber boniformis Shaw 1802 Gen. Zool. 1, p 511 (based on Russell & Fedda Poda and Bora)

Python bors Daudin, 1802 Hist Nat Rept. v p 226 (based on Russell & Bora)

Python tigris Daudin, 1802 Hist Nat Rept. v p 226 (based on Russell & Fedda Poda)

Python bicuspidatus Schlegel (in part) 1837 Phya Serp. 2, p 403 pl x figs 1 & Werner Zool Jahrb Syst xxv 1909 p 271

273 fig A. — *Python molurus* & *retusus* Mertens Abb Senckenb Nat Ges. xiv 1830 p 757 p vii (type loc fixed as Java)

Pope Rept Chuz, 1835 p 7° pl v Bourret Serp Indochine 1836 p 19 fig

Python molurus var. *ocellata* Werner 1839 Zool Garten, 2, p 24 and Zool Jahrb Syst xxv 1909 p 273 (India Ceylon);

Fraser J Bombay N H 8 xxx (1) 1814 p 186

Rostral at the posterior and upper part of a large anterior nasal rostral with a deep pit on either side internasals distinct two pairs of prefrontals the posterior pair smaller and often broken up frontals a little larger than the supraoculars often divided longitudinally parietal loreal and temporal regions covered with irregular scales 2 pre and 3 or 4 postoculars 11 to 13 supralabials the first 2 deeply pitted 6th or 7th touching the eye or separated by suboculars 16 to 18 infralabials, the anterior ones long and narrow

3 or 4 of the anterior and the same of the posterior feebly pitted; a well-defined mental groove: no proper genials. Scales in 60 to 75 rows, all quite smooth: V. 245-270, distinctly narrower than the breadth of the body: anal entire; C. 58 to 73 paired. Tail rather short.

Light yellowish to cream, greyish or brownish above, with a dorsal series of large, elongate, more or less subquadrangular dark grey, brown or reddish-brown, black-edged spots; these are usually more irregular in shape on the hinder part of the body; flanks with smaller, rounded or irregularly-shaped

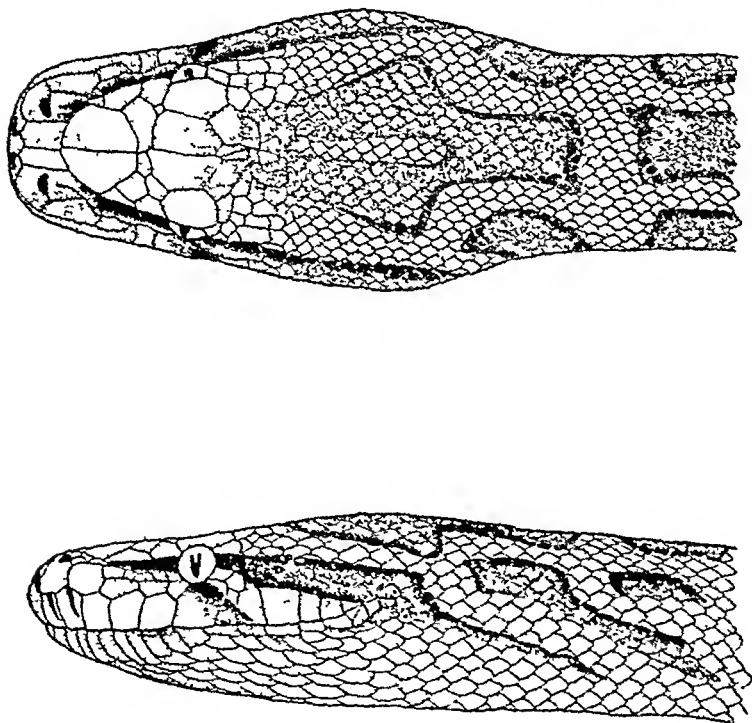


Fig 33.—*Python molurus*.

spots of the same colour; a lance-shaped mark on the top of the head extending on to the nape; a dark streak on the side of the head, broadening behind the eye and extending past the angle of the mouth; a dark subocular streak; below yellowish, with a border of dark spots on the outermost row of the scales; tail below marbled with yellow and black

No words can adequately describe the wonderful sheen on the scales of the Python in life, particularly when the skin has just been shed.

Total length.—Specimens that exceed 4 metres (about 12 feet) in length are rare and there does not appear to be any authentic record of individuals more than $6\frac{1}{2}$ metres (about 20 feet) in length. In earth *P. molurus* is considerably greater than *P. reticulatus* of the same length.

Two races have been distinguished —

Python molurus molurus

6th or 7th labial touching the eye, lance-shaped mark on the top of the head usually distinct only posteriorly.
1 253 270

Range Ceylon and Peninsular India to the extreme limit of Sind and the Punjab in the North West, and to Bengal in the North East.

Python molurus bivittatus

Labials separated from the eye by suboculars, lance shaped mark on the head distinct throughout V 241 to 270

Range The whole of the Indo Chinese subregion, Southern China, Hong Kong, Hainan.

In Southern Indo China it is rare. It has been recorded in Burma from as far south as Zimpha Chaung Tavoy district. I obtained three specimens in Siam at Raheng Lophun and Suracha. In French Indo China it is recorded from Nha Trang near Saigon. There are no authentic records of its occurrence in Peninsular Siam or the Malay Peninsula, but it has been found in Java. There is a specimen in Raffles Museum said to have come from Pontianak, Borneo and it is recorded from Celebes.

Wall has given good accounts of the Indian Python (1912 and 1921) and his coloured plate (1912) is excellent. The following remarks are taken mainly from his article. It is an inhabitant of the jungle but where this is not available is to be found near rivers and pools. It climbs well, and by means of its prehensile tail is capable of suspending itself from branches, there to wait until food comes within its reach. In water it is quite at home and might be considered semi-aquatic in habit. Observations made in captivity have shown that it can remain submerged for half an hour. In northern India during the cold season it hibernates for some months retiring into a hollow tree or hole in a bank or in the hills into some convenient cave. It is one of the most lethargic snakes and in its natural haunts exhibits little timidity, rarely rousing itself seriously to escape. Its movements are laboured and slow, in fact its mode of progression cannot be called anything but a crawl. This is in marked contrast to the more slenderly built *reticulatus* that in jungle and upon trees can move with considerable speed.

The Indian Python is practically omnivorous, feeding on mammals, birds and reptiles indiscriminately. It seems to prefer mammals of relatively large proportions. Its strength is enormous. An individual 18 feet long has been known to overcome and devour a leopard measuring 4 feet 2 inches from nose to rump. Authentic records of its attacking human beings are rare. Wall records a case of a Chinese baby being devoured on an island near Hong Kong.

It is one of the few snakes that is eaten by man. Those who have tasted the flesh say that it is good. Aesthetic reasons no doubt prevent it from becoming a regular article of diet with all, but by many of the less fastidious peoples of India and Indo-China it is eaten frequently.

The Indian Python, like all the Pythons, is oviparous. After depositing her eggs, the mother coils herself round them and remains with them until they hatch out. The number of eggs laid varies enormously: as many as 107 have been recorded.

Mating, in northern India, takes place during hibernation. The eggs vary slightly in size; some laid in the Berlin Aquarium averaged 120×60 mm. Hatchlings measure on an average 2 ft. 5 inches in length. The rate of growth in nature is not known, and the records of growth in captivity vary so greatly that they are obviously influenced by the conditions under which the snakes live.

69. *Python reticulatus*.

RETICULATED PYTHON.

Boa reticulata Schneider, 1801, Hist. Amph. ii, p. 264 (based on Seba, i, pl. lxii, fig. 2, and ii, pl. lxxix, fig. 1; no type loc. given).—

Python reticulatus, Boulenger, F. B. I. 1890, p. 246, and Cat. Sn. Brit. Mus. i. 1893, p. 85; Werner, Arch. Nat. Berlin, lxxxvii, 1921, p. 236; Wall, J. Bombay N. H. S. xxix, 1923, p. 353, and xxxi, 1926, p. 84; Kopstein, Trop. Natuur, 1927, p. 65; M. A. Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 9, and xi, 1937, p. 61; Bourret, Serp. Indo-Chine, 1936, p. 16, fig.

Boa rhombata Schneider, 1801, Hist. Amph. ii, p. 266 (based on Seba, ii, pl. lxxx, fig. 1).

Boa phrygia Shaw, 1802, Gen. Zool. iii, p. 348, pl. xcvi (based on Seba, i, pl. lxii, fig. 2).

Coluber javanicus Shaw, l. c. s., p. 441 (Java).

Like *molurus* in head scalation, differing as follows:—4 anterior supralabials deeply pitted; 2 or 3 anterior and 5 or 6 posterior infralabials feebly pitted; 6th or 7th supralabial touching the eye; no suboculars. Scales in 70 to 80 rows. V. 297–332; C. 75–102, mostly divided. Anal entire.

Light brown or yellowish above with a dorsal series of large darker brown, circular, oval or rhomboidal spots, often confluent with one another; each spot is edged with black

and outside again with yellow, these two colours descending upon the flanks in a regular series of vertical bars or V-shaped marks, each one of which encloses a white spot; whitish or yellowish below, the outer scale rows spotted or dappled with brown. A black streak along the middle of the head and another on each side from the eye to the angle of the jaw.

Total length.—The Reticulated Python is the largest snake living to-day the South American Anaconda running it closely for second place. Authentic measurements of specimens that have been killed show that it reaches a length of 27 or 28 feet. Greater lengths have been recorded, but they cannot be relied upon.

Range Tenasserim, southern Burma and Siam as far north as lat. 18°, French Indo-China as far north as Yen Bai in Tong King the Malay Peninsula and Archipelago; the Nicobar Islands.

In Indo-China, in the regions in which it occurs, the Reticulated Python is not uncommon. Wall states (1926), "In Burma this Python is only met with in the densest jungles places unknown to Europeans with the exception of a few forest officers." This is strange, for in Siam its habits are the reverse and it is a frequent visitor to human habitations. Flower who lived in Bangkok in 1897 and 1899, writes that "it was very numerous in the city and suburbs, and in almost every compound has been found in the last few years. It seems to prefer the busiest spots along the river, where boats are loading and unloading and hundreds of coolies pass to and fro. At night it makes an easy living devouring fowls, ducks, cats and dogs." When I went to live there a few years later it was quite as common, and for many years after, until the city became much larger and more crowded, I could usually catch two or three every year in my compound, which was within 100 yards of the main thoroughfare. Like the Indian Python the Reticulated Python is a great lover of water and is seldom found far from it.

All the available records show that it seems to prefer comparatively small mammals as food rather than very large ones. Mr. Owen, however, shot one in Singapore in the act of devouring a full sized boar. Kopstein (1927) relates that in the Dutch East Indies a boy of 14 years of age was swallowed by one.

As with most other snakes the number of eggs laid varies with the size of the mother. A full grown female has been known to lay 100 eggs, on the other hand, a 10 foot female killed in Bangkok contained only 15 eggs. The incubation period ranges from 60 to 80 days and the young when born measure from 600 to 750 mm. in length.

Genus ERYX.

SAND BOAS.

Eryx Daudin, 1803, Mag. Encycl. An. 8. v, March, p. 437, and Hist. Nat. Rept. vii, 1803, p. 251 (type *turcicus*); Boulenger, F. B. I. 1890, p. 247, and Cat. Sn. Brit. Mus. i, 1893, p. 122; Stull, Proc. Boston. Soc. Nat. Hist. xl, 1935, p. 406.

Clothonia Daudin, l. c. s. p. 253 (type *Boa anguiformis*).

Gongylophis Wagler, 1830, Syst. Amphib. p. 192 (type *Boa conica*); Boulenger, F. B. I. 1890, p. 246.

Cursoria Gray, 1849, Cat. Sn. Brit. Mus. p. 107 (type *elegans*).

Anterior maxillary and mandibular teeth very long. Head not distinct from neck, covered with small scales except on the

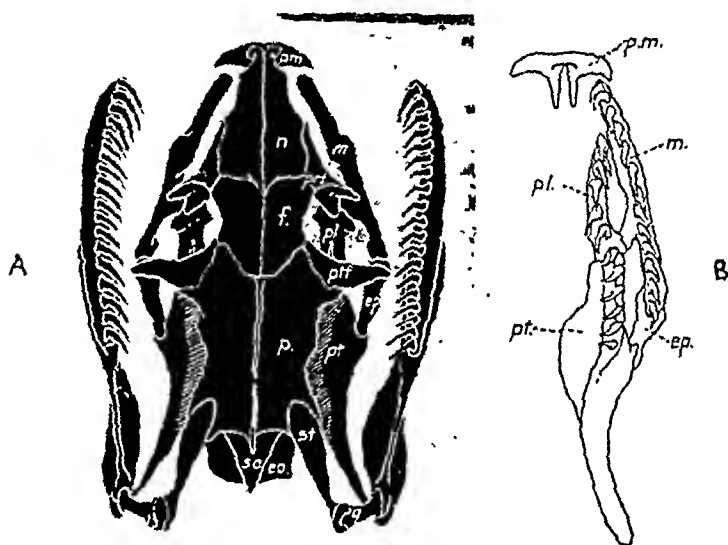


Fig. 34.—Skull of *Eryx conicus*. A. Dorsal view. B. Premaxilla and palato-maxillary arch.

ca., columella auris (or stapes); co., exoccipital; ep., ectopterygoid; f., frontal; m., maxilla; n., nasal; p., parietal; pl., palatine; pm., premaxilla; prf., prefrontal; pt., pterygoid; ptf., post-frontal; q., quadrate; so., supraoccipital; st., supratemporal.

snout. Eye small or very small with vertically elliptic pupil. Body cylindrical, stout, scales small; tail very short; sub-caudals usually single. Mental groove usually present. No genials.

Range. Africa; S.W. Asia to eastern Europe; Western China and India.

Seven species are known, two of which inhabit India.

Key to the Species

No mental groove tail pointed
A mental groove tail blunt

conicus, p. 112
johni johni p. 113

70 *Eryx conicus*

RUSSELL'S SAND BOA

- Russell 1798 Ind Serp. 2, p. 5 pl. iv (Madras)
Boa conica Schneider 1801 Hist. Amphib. II, p. 268 and Denkschr.
 Akad. München VII, 1821 p. 119 pl. vi, fig. 2 (based on Russell) —
Gongylophus conicus, Boulenger F. B. I. 1890, p. 247 fig.
Deraniyagala Ceylon J. Sci., B. XIX, 1936 p. 235, fig. — *Eryx*
conicus Boulenger Cat. Sn. Brit. Mus. 4, 1893 p. 124, Wall,
 J. Bombay N. H. S. XVI, 1906 p. 292, and XXII, 1911, p. 2 and
 XXIX, 1923 p. 353, Pitman, ibid. XXX, 1913, p. 633, Russell,
 Levett-Yeats & Ghaspurey, ibid. XXX, 1914, p. 371-372,
 D. Abram, ibid. XXIV, 1916, p. 193, Trench, ibid. XXV, 1917,
 p. 151, Prater, ibid. XXX (I) 1924 p. 166, Fraser, ibid. XXXIX,
 1937 p. 466 pl. vi.
Boa viperina Shaw 1802, Gen. Zool. III, p. 355 pl. c (based on
 Russell)
Boa ornata Daudin, 1802, Hist. Nat. Rept. V, p. 210 (based on
 Russell)
Eryx bengalensis Guerin 1830 Iconog. Reg. Annu. Rept. pl. xs,
 fig. 1

Rostral about twice as broad as high, just visible from above, without angular horizontal edge; nostril slit like, between the two nasals and the internasals, only these scales enlarged, the rest of the head being covered with small, obtusely keeled scales, 8 to 10 scales across the forehead between the eyes, 10 to 15 scales round the eye, sometimes two series of scales separating the eye from the labials which are from 12 to 14 in number, no mental groove. Scales in 40 to 55 rows, more or less strongly, sometimes tubercularly, keeled, very strongly upon the tail. V 162-196, C 16-24. Tail pointed.

The hemipenis is not forked but the sulcus bifurcates near the tip of the organ, it is strongly flounced, the folds being arranged in oblique series distally they are joined together and form large cups.

Yellowish, brownish or greyish above with a dorsal series of large, dark brown, black-edged spots, usually confluent with one another to form a zigzag stripe, lower parts yellowish or whitish the outer scale rows with small brown spots.

Total length ♂ 480, tail 35, ♀ 940, tail 65 mm.

Range Ceylon, the whole of India as far as Bihar and Orissa in the north-east, Naini Tal district in the Himalayas, and Sind and Baluchistan in the west, very rare in Ceylon. Wall states that it is common in Cannanore in the Malabar

district and Ghazipur in the United Provinces. It has been recorded from the Central Provinces at an altitude of 2,200 feet.

It feeds upon small mammals, birds, snakes and frogs. From 6 to 8 young are produced at a time.

71. *Eryx johni johni* *.

JOHN'S SAND BOA.

Boa johnei Russell, 1801, Ind. Serp. ii, pp. 18 & 20, pls. xvi & xvii (Tranquebar)—*Eryx johni*, Boulenger, F.B.I. 1890, p. 248, fig., and Cat. Sn. Brit. Mus. i, 1893, p. 127; Wall, J. Bombay N. H. S. xx, 1911, p. 1033, and xxi, 1911, p. 12.

Eryx jaculus (non Linn.) Wall, 1910, J. Bombay N. H. S. xix, p. 1000; Prater, *ibid.* xxx, 1924, p. 166.

Eryx jaculus var. *johni* Ingoldby, 1923, J. Bombay N. H. S. xxix, p. 127; Wall, *ibid.* p. 353.

Rostral large, broader than high, well visible from above, with angular horizontal edge; nostril slit-like, between two

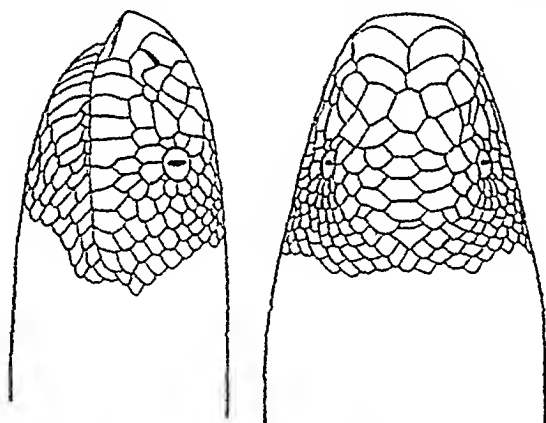


Fig. 35.—*Eryx johni*. (After Boulenger, F.B.I. 1890.)

enlarged nasals; usually two pairs of broad scales behind the rostral; the other scales on the top of the head in front of the eyes being larger than those posterior to them; 6 to 9 scales across the forehead between the eyes; 10 or 11 scales round the eye; sometimes two series of scales separating the eye from the labials, which are from 10 to 12 in number; a mental groove. Scales in 53 to 67 rows, more or less distinctly keeled. V. 190-210; C. 20-34; anal entire, small. Tail blunt, covered at the tip with a large rounded shield.

* Named after the Rev. Mr. John of Tranquebar.

Hemipenis as in *conicus* but the bifurcation of the sulcus farther back and the calyces more distinct

Sandy grey or yellowish above the scales edged with dark brown or entirely brown above, uniform or with more or less distinct dark transverse bands, these bands usually distinct on the tail lower parts whitish spotted with dark brown, or almost entirely brown

Total length ♂ 890 tail 90 ♀ 1000 tail 80 mm

Range North western India Sind, Rajputana, U P (Lucknow) Punjab Baluchistan, N.W.F.P. In the two last named areas it meets the western form *E. persicus*

Russell's type-specimen which is beautifully figured, came from Tranquebar and he states that it 'is not uncommon in Bengal' Whether this was true or not we cannot now say, but the regions to which he refers are well outside the area it now inhabits

Family COLUBRIDÆ

Colubridæ Cope, 1893 Amer Nat p 460, Boulenger (in part) F B I 1890 p 234 and Cat Sn. Brit Mus L 1893, p 189 Stejneger & Barbour Check List N Amer Amph. & Rept 1939 p 95

Amblycephalids Boulenger F B I 1890, p 414 and Cat m 1896 p 438

Facts! bones movable prefrontal not in contact with the nasal supratemporal attached loosely to the skull, suspending the quadrate mandible without coronoid bone, teeth solid or the posterior 2 or 3 grooved.

Range Cosmopolitan.

Key to the Subfamilies of the Colubridæ

- | | |
|---|--------------------|
| I. No mental groove; hypapophyses absent on the posterior dorsal vertebrae | DIPSADINÆ, p 115 |
| II. A mental groove; hypapophyses present or absent on the posterior dorsal vertebrae | |
| A. Ventral shields distinct | |
| Scales completely or almost completely attached to the cutis nostril in a large concave shield maxillary teeth not grooved | XENODERMINÆ p 123 |
| Nostrils not valvular usually lateral scales imbricate | COLUBERINÆ, p 135 |
| Nostrils valvular on the upper surface of the snout last 2 or 3 maxillary teeth enlarged and grooved ventrals rather narrow | |
| Palato maxillary arch edentulous except for a few minute teeth hypapophyses of the anterior thoracic vertebrae penetrating the wall of the oesophagus | HOMALOPHINÆ, p 379 |
| | DASYPLUTINÆ p 403 |

- B. No transversely enlarged ventral shields ;
 head and body covered with small
 granular or tuberculate juxtaposed
 scales ACROCHORDINÆ, p. 131.

Subfamily DIPSADINÆ.

Dipsadidæ Günther, 1858, Cat. Sn. Brit. Mus. p. 162 (in part).

Dipsadinæ Amaral, 1923, Proc. New Eng. Zool. Club, viii, p. 95.

Amblycephalidæ Boulenger, 1890, F. B. I. p. 414, and Cat. Sn. Brit. Mus. iii, 1896, p. 438 ; Pope, Rept. China, 1935, p. 366.

Supratemporal very small, reduced to a short rod of bone interposed between the cranium and the quadrate ; solid teeth in both jaws ; hypapophyses present only in the cervical vertebrae ; genials large, broader than long, touching the infralabials ; mental groove absent in the Asiatic species.

Range. S.E. Asia ; Central and South America.

Recent workers in this group have separated the American members from the Asiatic. The former can be connected, through *Sibon* (= *Leptognathus*) *sibon*, with the Colubrinæ ;

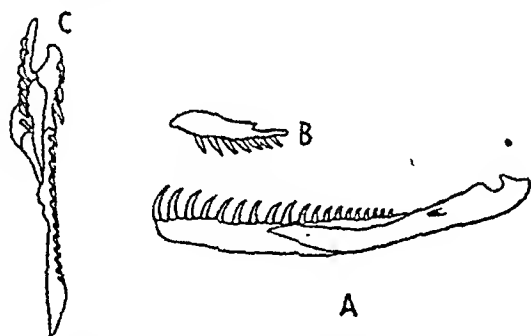


Fig. 36.—Jaw bones of *Pareas monticola*.

A. Mandible. B. Maxilla. C. Palato-maxillary arch.

the Asiatic genera cannot be, the characters of the shields covering the lower jaw serving to distinguish them at once from all other snakes. Nevertheless, the two groups are closely allied to one another, and probably had a common origin. The mouth is peculiar in that the commissure extends far back beyond the fringe of the buccal membrane, while the short, high head and large eye bear a remarkable resemblance to that of the foetal snake. Another feature of the Dipsadinæ is the enormous development of the nasal gland.

Key to the Asiatic Genera.

- Scales in 15 rows ; subcaudals paired *PARAS*, p. 116.
 Scales in 13 rows ; subcaudals single *HAPLOFELTURA*, p. 121.

Genus PAREAS

- Amblycephalus* (not of Zeller 1803) Kuhl, 18²², *Isis* p. 474 (nom. mod.) Bosc, *Isis* 18²⁷ p. 512 (type *larus*) Boulenger F B J 1890 p. 414 and Ca. Sn. Brit Mus i 1896 p. 440, and Ann. Mag. Nat. Hist. (3) xiv 1914 p. 484 Wall. Rec. Ind. Mus. xxiv 1922, p. 19 Pope Rept. China, 1935 p. 366 Bourret, Serp. Indochine 1938 p. 419
Pareas Wagler 1830 Syst. Amphib. p. 181 (type *corinatus*) Theobald, Rept. Brit. Ind. 1876 p. 203
Eberhardia Angel, 1920 Bull. Mus. hist. nat. Paris xvi, p. 291 (type *E. sublineata*)

Maxillary bone short thin expanded vertically with from 4 to 9 subequal teeth preceded by an edentulous space mandibular teeth gradually decreasing in length prefrontal bone with a backward prolongation more or less completely roofing the orbit Head distinct from neck eye large or moderate with vertical pupil Body more or less compressed tail moderate scales in 15 rows throughout ventrals rounded subcaudals paired

Common characters unless otherwise stated — Nostril in the nasal rostral as high as broad or a little higher usually first pair of genuals largest longer than broad in contact with the mental or separated from it by the first pair of infralabials anal entire

Hemipenis deeply forked, without spines.

Range. The Indo-Chinese Subregion Southern China the Malay Peninsula and Archipelago

About 16 species are recognised

The Indo-Chinese species fall into two natural groups those of Section I of the key being terrestrial in their habits those of Section II subarboreal The members of each group are closely allied to one another and although the characters which distinguish them are somewhat unstable the combination given will always suffice In disposition these small snakes are quiet and inoffensive I have never known them to bite when handled. They are nocturnal in their habits and appear to live chiefly on small molluscs. They are oviparous from 2 to 9 eggs being laid at a time

Key to the Species

- I. Vertebral scales not enlarged body not strongly compressed head distinct from neck eye moderate
Scales smooth
Scales keeled
- II. Vertebral scales enlarged body strongly compressed head very distinct from neck eye large.
 - a. Labial in broad contact with the eye no preocular
 - b. Labial excluded from or just touching the eye a preocular

[p. 117]

margaritophorus,
maculatus, p. 113.

monticola p. 113.

- Frontal shorter than the parietal; prefrontal touching the eye *hamptoni*, p. 120.
 Frontal as long as or longer than the parietal; prefrontal excluded from the eye *carinatus*, p. 121.

72. *Pareas margaritophorus*.

Leptognathus margaritophorus Jan, 1866, Nouv. Arch. Mus. hist. nat. Paris, ii, p. 8 (Siam; Paris).—*Pareas margaritophorus*, Theobald, Cat. Rept. Brit. Ind. 1876, p. 203.—*Amblycephalus margaritophorus*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 445. *Pareas mællendorffi* Boettger, 1885, Ber. Offenb. Ver., p. 125, and 1888, p. 84, pl. ii, fig. 1 (Lo-fou-shan Mts., Canton; Frankfurt); Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930 (2) p. 37.—*Amblycephalus mællendorffi*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 443, and Rept. Malay Pen. 1912, p. 210; Wall, Rec. Ind. Mus. xxiv, 1922, p. 23, and J. Bombay N. H. S. xxx, 1925, p. 245; Smith, Bull. Raffles Mus., No. 3, 1930, p. 88; Pope, Rept. China, 1935, p. 373; Bourret, Serp. Indo-Chine, 1936, ii, p. 433.

Eye moderate, its diameter equal to or a little less than its distance from the mouth: internasals half, or less than half, as long as the prefrontals, the latter usually in contact with the eye; frontal about as long as broad, longer than its distance from the end of the snout, shorter than the parietals; loreal longer than high; 1 pre- and 1 postocular, the latter often united with a long crescentic subocular; temporals 2+3, usually long and narrow; 6 or 7 supralabials, 4th below the middle of the eye; scales smooth, the vertebrals not enlarged. V. ♂ 138-153, ♀ 143-159; C. ♂ 44-56, ♀ 32-42.

Hemipenis extending to the 13th caudal plate, very deeply forked; divided into two portions by a fold which runs obliquely forwards from the sulcus; distal to the fold the organ is calyculate, the calyces being relatively uniform in size but without scalloped edges; proximal to the fold the organ is papillose, the papillæ being triangular in shape, with broad bases, and arranged in longitudinal folds.

Grey above with transverse bars on the sides composed of black and white spots, the anterior part of the scale being white, the posterior black; a white or yellow nuchal collar present or absent; lower parts whitish more or less thickly spotted or speckled with dark grey or black.

Total length: ♂ 345, tail 75; ♀ 470, tail 75 mm.

Range. French Indo-China; S. China; Hainan; Siam; Tenasserim; the Malay Peninsula as far south as Kelantan.

Common to many localities. Plentiful on Hong Kong Island, at Bangnara in Patani (sea-level) and at Dalat, on the Langbian Plateau, Annam, at 5,000 feet.

I have examined Jan's types of *margaritophorus* in Paris and have no hesitation in identifying them with the species commonly known as *mællendorffi*.

73 *Pareas macularius*

- Pareas macularius* Theobald, 1863 J. Linn. Soc. z. p. 55 (Martaban, S. Burma. London and Calcutta). Smith, Rec. Ind. Mus. xii. 1940 p. 481. — *Amblycephalus macularius*, Boulenger F. B. I. 1890 p. 416 and Cat. Sn. Brit. Mus. iii. 1896 p. 445; Wall, Rec. Ind. Mus. xxi. 1904 p. 21 and J. Bombay N. H. S. xxx. 1902 p. 243 and xxxi. 1900 p. 868.
- Pareas modestus* Theobald, 1868 J. Linn. Soc. z. p. 61, and Cat. Rept. Brit. Ind. 1876 p. 704 (Rangoon; Calcutta). — *Amblycephalus modestus* Boulenger F. B. I. 1890 p. 416 and Cat. Sn. Brit. Mus. iv. 1898 p. 444.
- Pareas andersoni* Boulenger 1888 Ann. Mus. Civ. Genova (2) vi. p. 601 pl. v. fig. 3 (Bhamo and Kakhayen Hills. Genoa). — *Amblycephalus andersoni* Boulenger F. B. I. 1890 p. 416 and Cat. Sn. Brit. Mus. iii. 1896 p. 444 and J. Bombay N. H. S. xvi. 1903, p. 33.
- Amblycephalus sandersoni* Bourret 1935 Bull. Gen. Instr. Pub. Hanoï x. p. 11 (Tam dao Tong Keng. Parai and Perp. Indochine, i. 1936 p. 431 (not seen by me).

Differs from *maellendorffi* in having the body more compressed the median 3 to 7 dorsal scale rows keeled and in the character of the hemipenis. This extends to the 12th caudal plate and is forked at the junction of the proximal one-third and distal two thirds. It can be divided into four areas namely a small one near the tip composed of longitudinal folds an area of small uniform calyces an area in which the calyces become more papillous in character and a proximal area near the bifurcation in which there are large smooth longitudinal folds. V ♂ 148-166 ♀ 154 165 C ♂ 40-53 ♀ 39-45.

Colour and size as in *marjaniophorus*.

Range. Burma (Hingnan lat 26° 36' long 97° 52' Mogoke Kyaphym Shwale Man Kalaw Martaban) Bengal (Gopal dhara Darjeeling dist.) Upper Laos Tong King.

74 *Pareas monticola*

- Dipno monticola* Cantor 1839 P. Z. S. p. 43, (Naga Hills Assam. London, vol. sketch in Bodleian Library). — *Pareas monticola* Günther Rept. Brit. Ind. 1854 p. 377. Anderson, P. Z. S. 1871 p. 728. — *Amblycephalus monticola*, Boulenger F. B. I. 1890, p. 415 fig. and Cat. Sn. Brit. Mus. iv. 1898 p. 443; Annandale, J. A. S. Bengal, 1905 p. 176 and Rec. Ind. Mus. vii. 1912 p. 50. Wall, J. Bombay N. H. S. xviii. 1908 p. 334, and xxx. 1908 pp. 356 and 443 and xxx. 1923 p. 243 and Rec. Ind. Mus. xxiv. 1922, p. 21. Bourret Serp. Indochine ii. 1936 p. 425 (in part).

Eye large its diameter greater than its distance from the mouth. internasals about half as long as the prefrontals the latter touching the eye. frontal longer than its distance from the end of the snout shorter than the parietals. loreal in broad contact with the eye. no preocular. a subocular touching the loreal and separating the anterior labials from

the eye, sometimes touching the postocular; 2 postoculars, the lower elongated and extending below the eye; temporals 2+2 or 2+3; 6 or 7 supralabials, last longest, 3rd and 4th, or 4th only, touching the eye, rarely excluded by the suboculars. Scales smooth, the vertebral series enlarged. V. ♂ 180-196, ♀ 177-195; C. ♂ 79-87, ♀ 69-80.

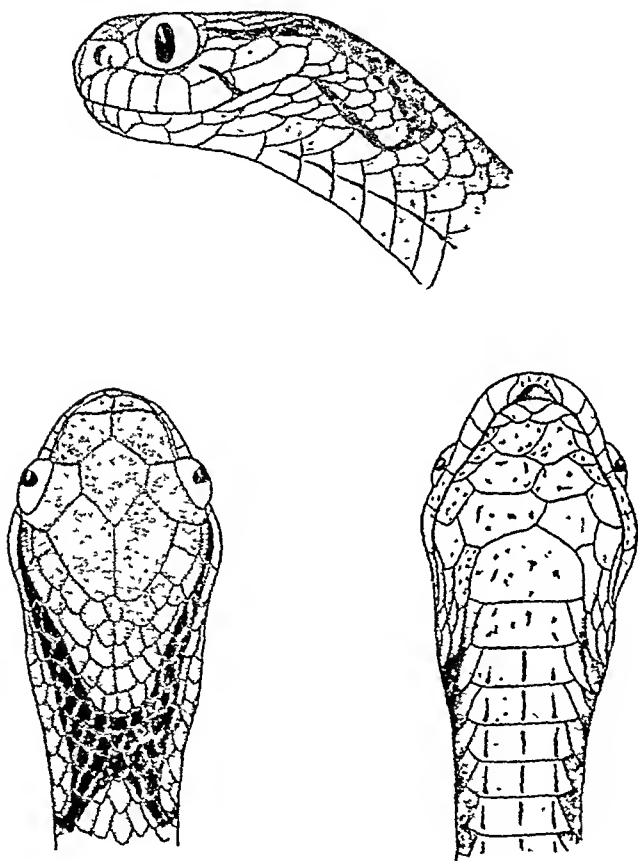


Fig. 37.—*Pareas monticola*.

Hemipenis extending to the 15th caudal plate, deeply forked; except for a small area near the bifurcation the organ is calyculate, the calyces being small, increasing slightly in size as they near the bifurcation and having slightly scalloped edges; for a short distance at the proximal end of the calyculate area the calyces are replaced by folds.

Brown above with vertical blackish bars on the sides, or extending across the back, a black line from above the eye to the nape, and another from behind the eye to the angle of the mouth, top of head more or less thickly spotted with black yellowish below, dotted with brown

Total length ♂ 560, tail 130, ♀ 730, tail 150 mm

Range Eastern Himalayas (Sikkim, Darjeeling district); Assam (Jaipur, Naga and Khasi Hills, Sadiya Frontier Tract) Annandale (1912) records that it is common in the Abor Foot-hills

75 *Pareas hamptoni*

Amblycephalus hamptoni Boulenger, 1905, J. Bombay N. H. S. xvi, p. 236 pl. — (Mogok, Burma, London), Parker, Ann. Mag. Nat. Hist. (9) xv, 1915 p. 305, Wall, Rec. Ind. Mus. xxiv, 1922 p. 26, and J. Bombay N. H. S. xxx, 1925, p. 245. — *Pareas hamptoni* Smith Ann. Mag. Nat. Hist. (10) vi, 1930, p. 681, and Rec. Ind. Mus. xlii 1940 p. 480 map

Eberhardia tonkinensis Angel 1920 Bull. Mus. Hist. Nat. Paris. xxvi, p. 291 figs 1-3 (Lackay Tong King, Paris), and ibid. (2) 1929 p. 80. — *Amblycephalus tonkinensis*, Bourret Serp. Indochine ii, 1934 p. 425 fig. Pope, Rept. China 1933 p. 376 fig.

Amblycephalus cornutus hainanensis Smith, 1923 J. Nat. Hist. Soc. Siam vi, p. 204 (Hainan, London)

Amblycephalus cornutus berdmorei Smith Bull. Raffles Mus. No. 2, 1930, p. 88 (in part)

Snout short, eye large, its diameter much greater than its distance from the mouth, internasals about half as long as the prefrontals the latter touching the eye, frontal longer than its distance from the end of the snout, shorter than the parietal, loreal as high as long, or higher, 1 pre- and 1 postocular, separated from one another by a long crescentic subocular, or the last two united, temporals 2+2 or 2+3, 7 or 8 supralabials, 4th or 5th below the middle of the eye. Scales smooth or the median series feebly keeled, vertebral scales (1 or 3 rows) feebly enlarged V ♂ 93-98, ♀ 73-87

Hemipenis short, extending to the 9th caudal plate, deeply forked, calyculate throughout, the calycea being very large and more or less uniform in size

Coloration and length as in *monticola*

Range Upper Burma (Mogok, Pangnawdim and Pairsa Gs. north of the Triangle*), N. E. Siam (near Pak Lai, lat 18°, Upper Mekong), Tong King, Hainan (Five Finger Mt.), Annam (as far south as Kontum, lat 18° 25')

* The Triangle is the country between the N. M. Kha and M. Kha Rivers as far north as lat 27°, south of lat 25° they combine to form the Irrawaddy. For a map of this area, see Smith, 1940

76. *Pareas carinatus*.

Amblycephalus carinatus Boie, 1828, Isis, p. 1035 (Java); Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 445; Smith, J. Nat. Hist. Soc. Siam, ii, 1916, p. 163; Wall, Rec. Ind. Mus. xxiv, 1922, p. 25, and J. Bombay N. H. S. xxx, 1925, p. 246; Bourret, Serp. Indochine, ii, 1936, p. 435, fig. head.—*Pareas carinatus*, Cochran, Proc. U.S. Nat. Mus. lxxvii (ii), 1930, p. 37.

Pareas berdmorei Theobald, 1868, Cat. Rept. Asiat. Soc. Mus. p. 63 (Tenasserim; Calcutta).—*Amblycephalus carinatus berdmorei*, Smith, Bull. Raff. Mus. No. 3, 1930, p. 88 (in part).

Amblycephalus carinatus unicolor Bourret, 1934, Bull. Gen. Instr. Pub. Hanoi (4), p. 15, fig. head (Kompong Speu, Cambodia; Paris), and Serp. Indochine, 1936, p. 437.

Snout short; eye large, its diameter greater than its distance from the mouth; internasals shorter than the prefrontals, the latter not or just touching the eye; frontal longer than its distance from the end of the snout, as long as or longer than the parietals; 1 pre- and 1 postocular; 2 to 4 suboculars, excluding the eye from the labials; temporals 2+3 or 3+3; 7 to 9 supralabials, last longest, 4th and 5th, or 4th, 5th and 6th below the eye. Scales feebly keeled, in females only the median series; vertebrals enlarged. V. 170-184; C. 60-88.

Hemipenis as in *monticola*.

Coloration and length as in *monticola*. Bourret records a specimen which is of a uniform reddish-brown colour (var. *unicolor*). I have examined a specimen, almost uniform in colour, from Me Wang, N. Siam.

Range. The Indo-Chinese Region south of lat. 19°; the Malay Peninsula and Archipelago.

The types of *P. berdmorei* are three in number, two adults and a juvenile. Theobald, in 1868, referred the juvenile to *macularius* and his determination has been generally accepted. After carefully examining it, however, I am unable to agree with his opinion, and refer all three specimens to the same species.

Genus HAPLOPELTURA.

Aplopeltura Dum. & Bibr., 1853, Mem. Ac. Sc., Paris, xxiii, p. 463 (type *Amblycephalus boa* Boie), and Erp. Gén. vii, 1854, p. 444.—*Haplopeltura*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 439.

Maxillary bone short, thin, expanded vertically, with 5 subequal teeth preceded by an edentulous space; mandibular teeth gradually decreasing in length. Head distinct from neck; eye large, with vertical pupil. Body compressed; tail long. Scales smooth, in 13 rows, the vertebral scales enlarged; ventrals rounded; subcaudals single.

The skull is remarkable for the wide vacancy which occurs between the parietal, frontal and sphenoid bones, a character found also in *Psemmophis*.

A single species

77 *Haplopeltura boa*

Amblycephalus boa Bon., 1828, *Isis* p. 1034 (Java), Gunther, *Rept Brit Ind* 1864 p. 325—*Haplopeltura boa*, Boulenger, *Cat Sn Rept Mus nat*, 1896 p. 439 and *Rept Malay Pen.* 1912, p. 209. De Rooij *Rept Indo Austral Arch.* ii, 1917, p. 274. *Sg.*, *Smith Bull Raffles Mus*, No 3 1930, p. 85.

Snout short, its length equal to or a little shorter than the diameter of the eye, nostril in the nasal, rostral much higher than broad, internasals about half as long as the prefrontals, frontal much longer than broad, longer than its distance from the end of the snout, longer than the parietals, the latter sometimes broken up and succeeded by a series of occipital shields, 2 superposed loreals; eye surrounded by a series of 7 or 8 shields exclusive of the supraocular, temporals 2+2 or 3+3, 8 to 10 supralabials, 3 or 4 pairs of large genials, the anterior pair sometimes fused to, or preceded by, an azygous shield, first 2 or 3 pairs of infralabials in contact with each other behind the mental. Scales smooth, the vertebral series much enlarged. V 166-175, C 106-122, A. 1. (Variation in six specimens from the Asiatic Mainland.)

Hemipenis extending to about the 15th caudal plate, deeply forked, throughout its entire length the organ is beset with fine transverse folds, these are close together at the distal end and become gradually further apart from one another as they approach the bifurcation, the sulcus lips are very prominent and are involved in the folds.

Yellowish, greyish, or pale brown above, yellowish or brownish beneath, indistinctly mottled and spotted with brown or dark grey, upper lip light yellow, 3 more or less distinct dark streaks radiating from the eye, one on the snout, one below the eye and one on the temporal region.

A specimen obtained in the Nakon Sritamarat Mts, P. Siam, was coloured in life as follows.—Pale grey with narrow black cross bars or almost complete bands, top of head and vertebral scales red, the former speckled with black.

I have examined a female containing 4 eggs.

Total length: ♂ 730, tail 260, ♀ 835, tail 265 mm.

Range. A Malayan species that just enters the Indo Chinese Subregion. Its habits are arboreal. Two specimens in my collection were obtained in heavy jungle at Chumpon, just north of the Isthmus of Kra. I do not know of any other records of this snake from the Indo Chinese region.

Subfamily XENODERMINÆ.

Xenoderminæ, Cope, Ann. Rep. Nat. Mus. 1898, 1900, p. 731;
 Werner, Mitt. Naturhist. Mus. Hamburg, xxvi, 1909, p. 206;
 Smith, Ann. Mag. Nat. Hist. (11) iii, 1939, p. 393.

A supraorbital bone; vertebræ with strong lateral expansions to the zygapophyses (except in *Achalinus* and *Fimbrios*); scales completely or almost completely attached to the cutis, more or less separated from one another by naked skin. Head with shields or granular scales; labials with more or less distinctly everted margins; nostril in a large, expanded, concave shield.

Range. Indo-China and the Malay Archipelago; Central America.

Key to the Genera.

- I. Head very distinct from neck.
 No frontal or parietal shields, the whole head, except the snout, covered with small granular scales; back with 3 series of large tubercles. XENODERMUS, p. 123.
 Frontal and parietal scales present, more or less entire; no enlarged tubercles on the back. STOLICZKAIA, p. 125.
- II. Head not or scarcely distinct from neck, completely shielded.
 Scales in 21 to 27 rows; labials without strongly everted edges. ACHALINUS, p. 126.
 Scales in 30 to 33 rows; anterior labials with strongly everted edges. FIMBRIOS, p. 128.

Genus XENODERMUS.

Xenodermus Reinhardt, 1836, Overs. Viden. Selsk. Forh. p. 6 (type *javanicus*); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 175;
 Smith, Ann. Mag. Nat. Hist. (11) iii, 1939, p. 393.

Gonionotus Gray, 1846, in Stoke's Discov. in Australia, i, p. 502 (type *plumbeus*).

Maxillary teeth equal, about 15 on each side; head distinct from neck; eye moderate, with vertically elliptic pupil; nostril in a large concave nasal; internasals and prefrontals present, the rest of the head covered with small granular, keeled scales. Body slender, feebly compressed, with very small elliptical, keeled scales, and three longitudinal series of enlarged tubercles, a vertebral and two dorso-lateral; ventrals well developed; tail long; subcaudals single. Vertebræ with expanded spinous process* and strong lateral expansions to the zygapophyses.

A single species.

Range. The Malayan Region.

* Found also in the South American *Xenopholis*.

78 *Xenodermus javanicus*

Xenodermus javanicus Reinhardt l.c. a., and K. Danako Vidensk. Selsk. Skrift x 1843 p. 237 pl. II, figs. 1-8 (Java); Boulenger, l.c. a. De Reuss, Rept Indo-Austral. Arch. II, 1917, p. 44, fig. Smith, Bull. Raffles Mus. No. 3 1930 p. 40, Kopstein, Bull. Raffles Mus. No. 14 1938, p. 165 pl. 25
Conasotus pholidus Gray l.c. a. (type loc. unknown: London).

Internasals narrow extending backwards above the nasal; prefrontals separated from one another by granules, rest of head covered with very small, juxtaposed, keeled scales; a series of small but distinct supra- and infralabials, their posterior edges everted first pair of infralabials narrow, in contact with one another behind the mental, a pair of elongated genials. Sides of body with very small, elliptical, keeled scales more or less separated from one another by naked skin dorsum between the lateral tubercles, with very

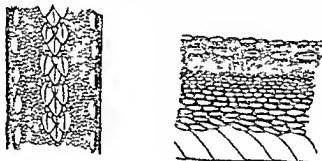


Fig. 35.—Scales of *Xenodermus javanicus* at mid body
 A Dorsal B Lateral view

small, juxtaposed, keeled scales, three series of enlarged, keeled tubercles extending the whole length of the body and tail, namely, a vertebral composed of three juxtaposed rows, and two dorso-lateral single rows V. ♂ 171-177, C. 147-165. V ♀ 176-186, C. 133-150 (Kopstein), A. I

Dark brown or blackish above, greyer on the sides and below.

Total length ♂ 670, tail 250, ♀ 645, tail 245 mm

Range The Malayan Region. Robinson & Kloss obtained a specimen at Victoria Point, S. Tenasserim, it is a female; V 170, C 103, the extreme tip of the tail being missing

Kopstein records a large series found in mid-Java at between 500 and 1100 metres altitude. He states that it is a nocturnal snake, living in loose and wet earth beneath the surface of

the ground. It frequents mostly cultivated fields, and feeds on frogs. Its movements are very slow. From 2 to 4 eggs are laid at a time.

The Malayan specimens and the one from Tenasserim were caught at sea-level near the coast.

Genus STOLICZKAIA.

Stoliczkaia Jerdon, 1870, Proc. Asiat. Soc. Bengal, p. 81 (type *khasiensis*); Boulenger, F. B. I. 1890, p. 354, and Cat. Sn. Brit. Mus. i, 1893, p. 175; Smith, Ann. Mag. Nat. Hist. (11) iii, 1939, p. 393.

Teeth small, subequal, 16 to 20 in each maxilla; head very distinct from neck, with large shields, the shields entire

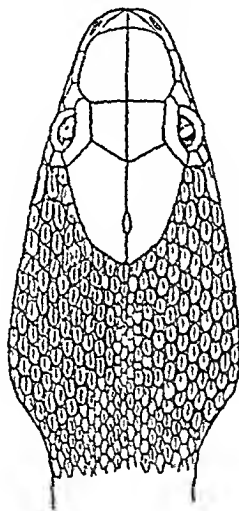


Fig. 39.—*Stoliczkaia khasiensis*.

or separated by small scales; posterior one-third of head and temporal regions covered with small scales like those of the body; nostril in a large concave nasal; eye large with vertically subelliptic pupil. Body slender, compressed; scales small, elliptical, keeled, juxtaposed or separated from one another by naked skin, in 29 to 31 rows; ventrals large; tail long and slender, subcaudals single. Vertebrae with much elongated spinous processes and strong lateral expansions to the zygapophyses.

Range. Assam and Borneo.

Two species.

79 *Stoliczkaia khasiensis*

Stoliczkaia khasiensis Jerd n 1870 I A S Bengal, p 81 (Khasi Hills London) Boulenger Y B I 1890 p 355 fig., and Cat Sn. B t Mus i 1893 p 175 Annandale J A S Bengal, 1904 p 209 pl ix figs a 2a b Wall J Bombay N H. S. xxix 1923 p 598

Rostral small not visible from above internasals small subtriangular prefrontals very large frontal broader than long about 4 times as broad as the supraoculars half as long as the parietals partially or completely divided by a longitudinal suture a small loreal 1 large pre and 2 post oculars 8 supralabials 4th and 5th touching the eye last very long anterior genials partly separated from the infralabials by small scales no posterior genials Dorsal scales separated from one another by naked skin laterals larger and juxtaposed V 208-210 C 115-116 A J

Purplish brown above ventrals and three outer scale rows white with brown bases

Total length 870 tail 100 mm

Range The type specimen is from the Khasi Hills Annandale records a second specimen from Assam without exact data of locality

Genus ACHALINUS

Achalinus Peters 1869 Mon Akad. Berlin, p 436 (type *synotis*) Boulenger Cat Sn. B t Mus i 1893 p 308 Pope Rept China, 1935 p 180 Smith, Ann Mag Nat Hist (11) 14, 1932 p 393

Opisthops Sauvage 1877 Bull Soc. Phil Parm (7) 1 108 (type *bracconius*)

Maxillary teeth 20 to 30 small equal mandibular teeth equal head not or scarcely distinct from neck eye moderate with vertically subelliptic pupil nostril in the anterior part of a large concave nasal or the shield partially divided by a vertical suture no preocular the loreal extending from the nasal to the eye postoculars not distinct from anterior temporals Body slender cylindrical scales in 21 to 27 rows keeled ventrals large rounded tail moderate subcaudals single

Range Japan China Tong King

Three or four species one of which inhabits Indo China

80 *Achalinus rufescens*

Achalinus rufescens Boulenger 1888 Ann Mag Nat Hist. (6) p 43 (Hong Kong London) Pope Rept China, 1935 p 181 ug Bourret Serp Indochine 1936 p 138 fig
Achalinus meridianus Smith, 1923 J Nat Hist Soc Siam vi p 200 (Nam kao S Hainan London)

Stoliczkaia kwangsiensis Fan, 1931, Bull. Dept. Biol. Col. Sci. Sun Yat Sen Univ. (11) p. 44, fig. (Lohsiang, Kwangsi); Pope, Rept. China, 1935, p. 181.

Achalinus niger Bourret, 1935, Bull. Gen. Instr. Pub. Hanoi, viii, p. 3, and Serp. Indochine, 1936, p. 139 (Tam-dao, Tong-King; Paris); and *Achalinus ater*, ibid. Dec. 1937, p. 72.

? *Achalinus spinalis*, and *braconnieri* Bourret, l. c. s. pp. 141, 142.

Rostral small, as broad as high, just visible from above; suture between the internasals longer than that between the

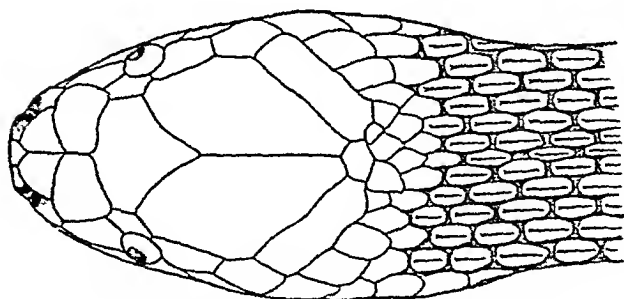
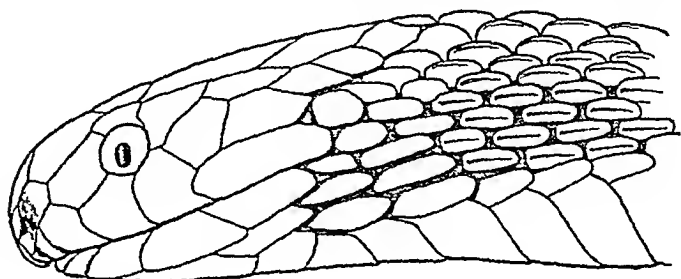


Fig. 40.—*Achalinus rufescens*. (B.M. 1924.5.22.10.)

prefrontals; frontal as broad as long, broadly truncate in front, shorter than its distance from the end of the snout; loreal large; temporals 2+2, usually only one anterior touching the eye; a large temporal shield bordering the parietal behind; 6 supralabials, 4th and 5th touching the eye, 6th very long; mental very short, just a strip; 3 infralabials in contact with the anterior genials, which are about as long as the posterior; first ventral in contact with the latter; mental and first two upper and lower labials with feebly raised,

everted margins. Scales strongly keeled, some distinctly tricarinate, in 25 rows. V 137-157, C 57-82, A 1.

Hemipenis very long and slender, extending to the 21st caudal plate, forked opposite the 4th; the distal one-third is calyculate, the calyces being small, of uniform size, and presenting a sponge like or honeycomb appearance, proximal to this the organ is flounced, the folds being transversely placed and set closely to one another. at the base are much thicker and more widely separated flouncers; extending the whole length of the organ are two prominent folds opposite one another, one of which encloses the vulvus.

Reddish brown dark grey above, paler below

Total length 390 tail 75 mm (♀)

Range Hainan, Tong King, Southern China, Hong Kong

Genus FIMBRIOS

Fimbrios Smith, 1929, P Z S p. 423 (type *klossi*), and Ann Mus Nat Hist (U) vol. 1929, p. 393

Maxillary teeth small 30 to 35, equal, dentary loosely attached to the articular. Head not distinct from neck, eye small, with rounded or vertically subelliptic pupil, nostril in the anterior part of a large concave nasal, no preocular; loreal very large, extending from the nasal to the eye, rostral, mental and labials with raised, everted edges. Body slender, cylindrical, scales keeled, in 30 to 33 rows, ventrals rounded, tail moderate, subcaudals single.

A single species

81 *Fimbrios klossi*

Fimbrios klossi Smith, 1929 P Z S, p. 425, fig. (Langbian plateau, S Annam, London), Pope, Rept China, 1925, p. 181; Bourret, Bull. Gen. Instr. Pub. Hanoi, May, 1937, p. 28, and Dec 1939, p. 23

Rostral separated from the internasals by a horizontal ridge of tissue, suture between the internasals shorter than that between the prefrontals, frontal broader than long, broadly truncate in front, about three times as broad as the supraoculars, shorter than its distance from the end of the snout, 1 pre- and 2 postoculars, the latter scarcely distinct from the temporals, which are 3+3 or 3+4, a subocular, 9 or 10 supralabials, last very long; anterior genials very large, covering nearly the whole of the chin in front, in contact with the first ventral, no posterior genials. Scales feebly imbricate anteriorly, some of the interstitial skin shewing, more strongly imbricate posteriorly. V 161-176, C 43-58; A 1.

Hemipenis deeply forked, the area distal to the bifurcation

* Foreshadowing the condition so marked in *Fimbrios*

being spinous, the spines at the extreme tip much the largest ; proximal to the bifurcation it is smooth ; the sulcus lips are very prominent.

Olivaceous to dark grey above, whitish below ; the posterior ventrals and subcaudals edged with darker.

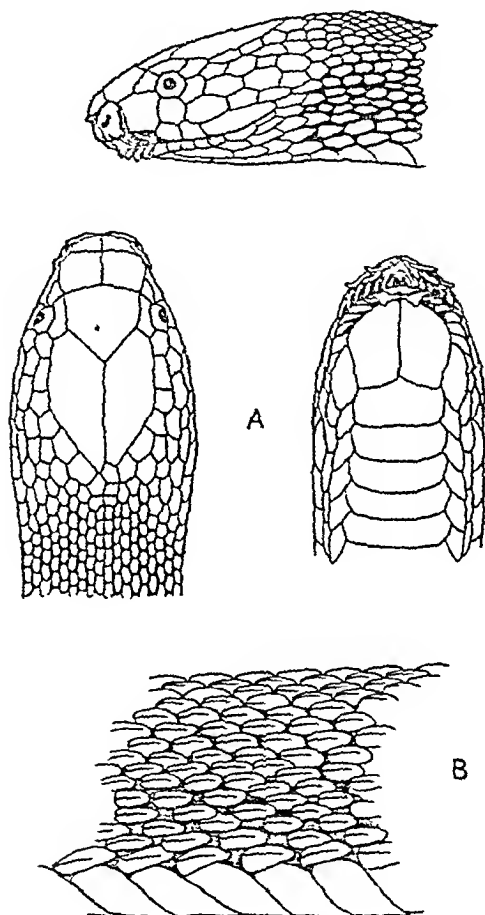


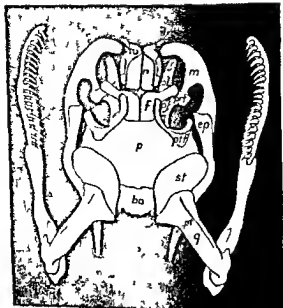
Fig. 41.—*Fimbrios klossi*.

A. Dorsal, lateral and ventral views of head. B. Dorsal scalation.

Total length : 395, tail 50 mm. (♀).

Range. S. Annam (Dalat and Camly on the Langbian plateau, Dong Tam-ve, Quang-tri Prov.) ; Cambodia (Bockor, Elephant Mts.).

Found in the hills at from 3,000 to 5,000 feet. Not uncommon at Bockor.



A



B

FIG 42.—*Arachnoides jenningsi*. A Internal view of skull B Palate
 bo., basoccipital; ep., ectopterygoid (or transpalatine) f., frontal
 m., maxilla p., parietal; p., palatine; pm., premaxilla;
 ptf., postfrontal pt., pterygoid; ptf., postfrontal q., quadrate st.,
 supratemporal; bo., basoccipital.

Subfamily ACROCHORDINÆ.

Acrochordida Jan, 1863, Elenco. sist. Ofid. p. 106 (in part); Cope. Proc. Acad. Philad. 1864, p. 231.—*Acrochordina* Boulenger. Cat. Sn. Brit. Mus. i, 1893, p. 172 (in part); Haas, Zool. Jahrb. Jena (Anat.), liv, 1931 (3), p. 378; Smith. Ann. Mag. Nat. Hist. (11) iii, 1939, p. 393.

Postorbital bone produced over the supraciliary region; frontal with an expansion on either side in front; prefrontal small, vertically suspended from the end of the expansion, not extending forwards upon the snout. Skin of the body loose, with small scales; no ventral shields. Hypapophyses developed throughout the vertebral column.

A single genus.

Genus ACROCHORDUS.

WART SNAKES.

Acrochordus Hornstedt, 1787, Abh. Acad., Stockholm, viii, p. 307 (type *javanicus*); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 173, de Rooij, Répt. Indo-Austral. Archipel. ii, 1917, p. 42; Schmidt, Zool. Jahrb. Jena, xl (Anat.), 1917, p. 155.

Potamophis (not of Cantor or Fitzinger) Schmidt, 1852, Abh. Naturw. Hamburg, ii, p. 75 (type *javanicus*).

Chersydrus Cuvier, 1817, Règne Anim. ii, p. 75 (type *fasciatus*); Boulenger, F. B. I. 1890, p. 355 and Cat. l. c. s. p. 173; de Rooij, l. c. s., p. 43.

Maxillary teeth subequal, 12 to 15 on each side; anterior mandibular teeth longest; head not distinct from neck, covered with small, granular scales; nostrils close together, surrounded by a circular nasal shield; eyes on the upper surface of the head, very small, with vertically elliptic pupil; mentum produced forwards and fitting into a deep concavity in the upper jaw; a longitudinal depression in the chin behind the mentum; body stout, covered with loose skin; scales very small, juxtaposed or subimbricate; no ventral shields; tail rather short; feebly compressed; prehensile.

Range. India; Indo-China and the Indo-Australian Archipelago; N. Australia.

Two species.

The presence of a distinct median abdominal fold in *Chersydrus granulatus* does not seem sufficient to separate it generically from *Acrochordus*.

In *A. granulatus* the columella auris is normal; in *A. javanicus* it is reduced to a short rod of bone or cartilage attached to the fenestra ovalis but not reaching the quadrate,

Key to the Species.

- Nostrils at the end of the snout, pointing mainly forwards; no distinct fold of skin along the median line of the belly *javanicus*, p. 132.
 Nostrils on the upper surface of the snout, pointing mainly upwards; a distinct raphe along the median line of the belly *granulatus*, p. 134.

82 *Aerochordus javanicus*

JAVA WART SNAKE ELEPHANT'S TRUNK SNAKE

Aerochordus javanicus H. M. Stead, l. c. v. pl. xii (Java); Schlegel, *Abbild. Amphib.* 1839 pl. xvii (skull). Boulenger, *Cat. Sn. Brit. Mus.* 1893 p. 173. Smith, *J. Nat. Hist. Soc., Siam*, 1, 1914, p. 13 photo.—*Polyommophis javanicus*, Schmidt, 1852, *Abh. Naturw. Hamburg*, ii p. 78.
Aerochordus dubius Shaw, 1802, *Gen. Zool.* iii, p. 573, pl. cxxix (type loc. unknown).
Chersydrus granulatus, Wall, *J. Bombay N.H.S.* xiii, 1914, p. 372.

Snout blunt, nostrils pointing almost directly forwards;

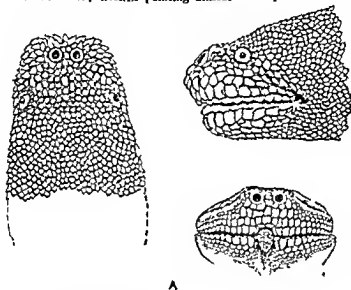


Fig. 43.—*Aerochordus javanicus*. A Dorsal, lateral and front views of head. B Photograph of a piece of dorsal skin ($\times 9$).

eyes on the upper surface of the head, pointing upwards and outwards, head above with very small scales, 18 to 22 on a line between the eyes, tubercular or spinous on the vertex, larger and flat towards the mouth, a series of small supra- and infralabials, 25 to 30 in number, 130 to 150 scales round the body, the scales juxtaposed, broader than long, trifid, the median spine the longest, no fold of skin along the middle of the belly, except sometimes anteriorly, the scales on the mid line are narrower and have longer spines than those adjacent to them.

Hemipenis forked for more than half its length : the distal end as far as the bifurcation is strongly spinous, the spines involving the lips of the sulcus : proximal to the bifurcation there are smooth longitudinal folds.

Brown or olive-brown above, paler below, flanks with large rounded or elongated spots. Young individuals are usually spotted all over above.



B

Total length : ♂ 1150, tail 250 ; ♀ 1835, tail 320, girth 275 mm.

Range. Siam ; Cambodia ; Cochin China ; the Malay Peninsula and Archipelago ; Queensland.

The Elephant's Trunk Snake, as it is called by the Siamese, is not uncommon in the vicinity of Bangkok, inhabiting the river and the canals which abound there. On land it is quite

out of its element and its movements are slow and clumsy, progressing more like a gigantic worm than like a snake. It is of an extremely sluggish disposition, and in the day time can hardly be induced to move. If handled quietly it makes no attempt to bite, but if roughly seized will turn swiftly and with its large teeth can inflict severe wounds. It appears to feed entirely upon fish. It is a prolific creature producing from 25 to 32 young at a time.

The snake recorded by Wall (1914) is not now available for examination, but it surely refers to this species and not the next one.

63 *Aerorchardus granulatus*.

Hylea granulatus Schneider 1799, Hist Amph i, p. 243 (India) — *Cherodryus granulatus*, Boulenger, F. B. J. 1890, p. 333 fig and Cat Sn Brit Mus i 1893 p. 174, Annandale J. A. S. Bengal, 1905 p. 175 and Mem Ind Mus v, 1915, p. 169, Wall, J. Bombay N. H. S. xxv 1918 p. 755, and Sn. Ceylon, 1921, p. 79, Prater J. Bombay N. H. S. xxx, (1) 1924 p. 187. *Acroelordis fasciatus* Shaw, 1802 Gen Zool iii, p. 576, pl. 130 (type loc. unknown). *Cherodryus annulatus* Gray 1849, Cat Sn Brit Mus p. 61 (Singapore & Madras, London).

Eyes more lateral than in *A. javanicus*, nostrils on the upper surface of the snout, pointing mainly upwards, scales on the snout a little larger than those on the hind part of the head, an enlarged scale behind each nasal shield, 8 to 11 scales on a line between the eyes, a series of enlarged scales on the lips separated from the border of the mouth by smaller scales, about 100 scales round the middle of the body, juxtaposed or feebly imbricate, with a central tubercle or short keel, a fold of skin along the middle of the belly covered with small spinous scales, hinder part of body and tail more compressed than in *A. javanicus*.

Hemipenis forked for more than half its length, and longitudinally pleated throughout, the folds on the distal half bearing spines, the sulcus lips are very prominent and are not spinose.

Dark grey or blackish with whitish cross bars or annuli which may become indistinct in the adult, the dark bands round the body are broader above than below, head dark grey with light spots above. Rarely the white colour may predominate, so that the snake appears white with dark cross bars.

Total length 1000, tail 100 mm ♀

Range The coasts of Ceylon, India, and Indo China, as far as Bombay in the West and Cochun China in the East, the Nicobar Is., south through the Indo Australian Archipelago to the north coast of Australia and the Solomon Islands.

According to Wall it is fairly abundant round the coasts of India. It is exceedingly common in the Gulf of Siam, inhabiting the seas chiefly in the neighbourhood of estuaries. Large numbers are daily caught by the fishermen in their nets. It feeds upon fish and is of a quiet and inoffensive disposition. Like *A. javanicus* it is helpless on land. From 6 to 8 young are produced at a time. They average at birth about 220 mm. in length.

Subfamily COLUBRINÆ.

Colubrinæ, Cope, Ann. Rep. U.S. Nat. Mus. 1896,—Part II. Croc., Liz. and Snakes of N. Amer. 1900, p. 778; Boulenger, F. B. I. 1890, p. 278, and Cat. Sn. Brit. Mus. i, 1893, p. 177.

Colubrinæ and *Boiginiæ*, Pope, Rept. China, 1935, p. 78.

Natricinæ, *Coronellinæ* and *Boiginiæ*, Bourret, Serp. Indo-Chine, 1936, p. 31.

Nostril usually lateral; head covered with large symmetrical shields; ventrals well developed. Teeth solid, or the posterior 2 or 3 grooved; hypapophyses absent or present on the posterior dorsal vertebræ.

Key to the Genera of the Colubrinæ.

A. All the teeth solid, not grooved (*Aglypha*).

I. Hypapophyses absent on the posterior dorsal vertebræ, the lower surface of which is smooth or with a low keel.

A. Posterior maxillary teeth longest.

1. Pupil round.

a. Longitudinal series of scales in odd numbers.

Last 2 or 3 teeth usually larger and separated from the others by a distinct interval; one or more suboculars; scales in 19-33 rows; head distinct from neck

COLUBER, p. 166.

12-20 teeth, last 2 largest, and separated or not from the rest by an interval; scales in 23 rows; no subocular

CORONELLA, p. 193.

20-28 teeth, gradually enlarged and forming a continuous series; scales in 17 (16, 18) or 15 rows; 2 or 3 loreals

PTYAS, p. 158.

25-30 teeth gradually enlarged, and forming a continuous series; scales in 17 rows, the vertebrals enlarged.

XENELAPHIS, p. 176.

6-16 teeth, the posterior strongly enlarged and compressed; head not or scarcely distinct from neck; rostral large, usually extending well on to the upper surface of the snout (fig. 62); scales smooth, in 13-21 rows

OLIGODON, p. 195.

b. Longitudinal series of scales in even numbers.

Scales in 14-18 rows

2 Pup: vertically elliptic: 6-10 teeth

Scales in 13 or 15 rows

Scales in 19 rows about conic form, with projecting rostral

B Maxillary teeth subequal pup: round

Scales in 19 to 27 rows with apical pits

Scales in 15 rows without apical pits colour green

Scales in 15 rows with apical pits colour not green

Scales in 13 to 17 rows without apical pits colour not green

Scales in 13 rows no loreal no internasals; no temporals

Scales in 19 rows a long pointed nasal appendage covered with small scales

Scales in 13 to 15 rows oblique the vertebrae enlarged ventrals and caudals with a suture like lateral keel and a notch on each side corresponding to the keel

C Some of the anterior maxillary teeth enlarged and fang like pup: vertically elliptic scales in 15 to 19 rows

Maxillary bone strongly arched scales in 17 rarely 15 rows smooth or feebly keeled; subcaudals paired

Maxillary bone not arched scales in 17 rows the median feebly keeled subcaudals paired

Maxillary bone strongly arched scales in 19 rows strongly keeled; subcaudals single

II Hypapophyses developed throughout the vertebral column, represented on the posterior dorsal vertebrae by a more or less developed crest or tubercle projecting below the centrum

A. Dentary bone attached loosely to the apex of the articular and freely movable on it 30 to 60 teeth, equal in size

Scales smooth, in 17 rows

B Dentary bone not or but slightly movable on the articular; usually less than 30 teeth

1 Posterior maxillary teeth longest

2 Internasals pup: round

Maxillary teeth 13 to 33; scales in 15 to 19 rows not disposed obliquely

Maxillary teeth 20 to 26 the last two abruptly enlarged scales in 19 rows disposed obliquely anteriorly

Maxillary teeth 11 to 13 followed by a pair of very large fangs scales in 25 to 27 rows strongly keeled

ZALOCYS p 163

DYOCALANUS p 27*

LYTOKRYNCHUS p 182

ELAPSE p 139

OPHEODONTA p 171

CONTIA p 187

LIOPELITES p 181

CALAMARIA p 238

RETROPHIS p 182

ANATILIA p 239

LYCODOX p 235

DINODOX p 262

CERCATER p 267

HELYNOMIS p 276

NATREX p 281

PSEUDOXENODON [p 311]

MACROPISTRODON [p 314]

- b.* 2 internasals: pupil vertical.
 Maxillary teeth 35, the last three much larger than the others [p. 316.
PARARHABDOPHIS,
c. 1 internasal.
 Nostril directed upwards and outwards;
 scales in 19 rows ATRETIVM, p. 319.
 2. Maxillary teeth equal, 20 to 25;
 head distinct from neck.
 Nostril in the nasal; scales in 19 rows, strongly
 keeled XENOCHROPHIS, p. 317.
 3. Maxillary teeth subequal; head not
 distinct from neck; scales in 13 to
 19 rows.
a. Nostril directed forwards and out-
 wards.
 18 to 20 teeth; head shields normal or pre-
 frontal single; scales in 13 to 15 rows.... TRACHISCHIUM, p. 321.
 20 to 24 teeth; internasal single; no loreal;
 scales in 15 to 17 rows ASPIDURA, p. 334.
 20 to 22 teeth; no loreal or preocular; scales
 in 13 rows BLYTHIA, p. 338.
 28 to 30 teeth; no preocular; anterior genials
 very large; scales in 13 to 15 rows XYLOPHIS, p. 341.
 10 to 12 teeth; internasal single; no loreal;
 scales in 17 rows HAPLOCERCUS, p. 340.
b. Nostril not directed forwards.
 Nostril lateral, between two nasals, or between
 them and the first labial; body not
 elongate; scales in 15 rows [p. 324.
 Nostril in the nasal, valvular, crescentic;
 body elongate; scales in 17 rows..... PLAGIOPHOLIS,
 Nostril in the nasal, directed upwards and
 outwards; prefrontal very broad, usually
 single; scales in 15-19 rows RHABDOPS, p. 327.
 [p. 330.
 OPISTHOTROPIS,
B. Last 2 or 3 maxillary teeth grooved;
 hypapophyses present or absent on the
 posterior dorsal vertebræ (*Opistho-*
glypha).
A. Pupil round.
 Solid maxillary teeth 20 to 24, subequal;
 scales in 19 rows, ventrals rounded..... BALANOPHIS, p. 310.
 Solid maxillary teeth 18 to 20, subequal;
 scales in 17 rows; ventrals and caudals
 with a suture-like lateral keel, and a notch
 on each side corresponding to the keel.... CHRYSOPELEA, p. 250.
 Maxillary teeth 10 to 13, one or two in the
 middle enlarged and fang-like; scales in
 17 rows..... PSAMMOPHIS, p. 361.
B. Pupil vertical.
 Solid maxillary teeth 10 to 14, subequal;
 scales more or less oblique, vertebrals
 enlarged, in 19 to 29 rows..... BOIGA, p. 344.
 Solid maxillary teeth 8 to 12, anterior longest;
 scales oblique, vertebrals not enlarged,
 in 23 rows TARBOPHIS, p. 360.
 Maxillary teeth 18 to 20, the median enlarged
 and fang-like; scales in 17 rows [p. 368.
 PSAMMODYNASTES,
C. Pupil horizontal.
 Scales oblique, in 15 rows DRYOPHIS, p. 370.

To arrange the many genera enumerated in serial order is not possible. *Elaphe* and its allies, the Colubrine or Coronelline branch of the Colubridæ, in having a simpler type of dentition and no hypapophyses on the posterior dorsal vertebrae are less specialized than are the members of the Natricine branch and are placed first. On the other hand, as shown by their variety of form and coloration, and the multiplicity of their races they are just as highly advanced, if not more so. They are very distinctly on the upgrade.

I arrange the genera in its groups. The members of each one are related to one another, but not necessarily to those of any other group. The arrangement for many of the genera is tentative and further research will no doubt modify what is expressed here.

1 *Elaphe*, *Ptyas*, *Coluber*, *Zaocys*, *Ophiodrys*, *Liopeltis*, *Conopsis*, *Xenelaphis*, *Lytorhynchus*, *Rhynchophis*—The Old World species of *Coluber* inhabit S.W. Asia, Europe and North Africa. Although certain differences in dentition and in the number of scales round the body distinguish them as a whole from their North American relatives, there are too many exceptions to separate them generically. *Ptyas* is closely related to the American species of *Coluber*, to the Malayan *Gonyophis*, and also to *Zaocys* with which it connects through *P. mucosus*. Together with *Elaphe*, they form a fairly well-defined group. *Ophiodrys*, *Liopeltis* and *Conopsis* are presumably derived from them. *Lytorhynchus* is closely related to the American *Phyllorhynchus* as perhaps also is *Rhynchophis*.

2 *Coronella*, *Oligodon*, *Calamaria*—*Coronella* is closely related to the American *Lampropeltis*.

3 *Atheris*, *Chrysopheles*—Their nearest relatives are the Ethiopian *Chlorophis* and *Philophthalmus* and the Malayan *Dryophiops*.

4 *Lycodon*, *Dinodon*, *Cercaspis*, *Dryocalamus*—The first three genera are closely related to one another and to the African *Bardonia*, *Lycophidion* and *Simocephalus*. Through the Malayan *Lepturophis* and the Indo Australian *Stegonotus* they connect with *Dryocalamus*.

5 *Sibynophis* has no near relatives.

6 *Natrix*, *Pseudoxenodon*, *Macropisthodon*, *Balanophis*, *Pararhabdophis*, *Atractum*, *Xenochrophis*—*Natrix* is the least specialized and most widely distributed, its range is cosmopolitan. *Pseudoxenodon*, *Macropisthodon*, *Balanophis* and *Pararhabdophis* have been derived from it, and together they form a closely related group. *Atractum* has affinities with the American *Helicops* and *Liodytes*.

7. *Trachischium*, *Aspidura*, *Blythia*, *Xylophis*, *Haplocercus*, *Plagiopholis*, *Rhabdops*, *Opisthotropis*.—A degenerate assemblage, perhaps derived from the previous group.

8. *Psammophis*, *Psammodynastes*.—*Psammophis* is closely related to the Ethiopian *Trimorrorhinus*, *Dromophis*, *Rhamphiphis* and *Mimophis*. It is an entrant into the Oriental Region from the north-west. *Psammodynastes* is placed here but has no close connection.

9. *Boiga*, *Tarbophis*.—*Boiga* is widely distributed from Africa, through the Oriental Region to Australia. *Tarbophis* in S.W. Asia and Africa is derived from it.

10. *Dryophis* is related to the Ethiopian *Thelotornis* and *Dispholidus*. *Taphrometapon*, *Psammophis* and *Dryophis* agree with one another in having a wide vacuity in front of the braincase between the frontal and sphenoid bones, a condition, as pointed out by Boulenger (Cat. III. pp. 152 and 185), which approaches that of the Lacertilia. The strongly forked condition of the ectopterygoid, seen in *Thelotornis* and *Dispholidus*, is foreshadowed in that of *Dryophis* (fig. 118) and some species of *Boiga* and *Tarbophis* (figs. 111 & 113). It probably has no phylogenetic significance.

Genus ELAPHE.

Gonyosoma Wagler, 1828, Icon. Amphib. pl. ix (type *viride*=*oxycephala*).

Elaphe Fitzinger, 1833, in Wagler's Descr. Icon. Amphib., pt. 3, text to pl. xxvii. (type *parreysi*=*quatuorlineatus*); Stejneger, Herpet. Japan, 1907, p. 307; Pope, Rept. China, 1935, p. 227.

Callopellis Fitzinger, 1834, in Bonaparte's Icon. Faun. Ital. ii, fol. 38 (type *leopardina*).

Cælognathus Fitzinger, 1843, Syst. Rept. p. 26 (type *Coluber radiatus*).

Pantherophis Fitzinger, l. c. s. p. 25 (type *Coluber guttatus*).

Cynophis Gray, 1849, Ann. Mag. Nat. Hist. (2) iv, p. 246 (type *bistrigatus*=*helena*).

Alopecophis Gray, l. c. s. p. 247 (type *chalybeus*=*oxycephala*).

Plagiodon Duméril, 1853, Mem. Acad. Sci. France, xxiii, p. 447 and Dum. & Bib. 1854, Érp. Gen. vii, p. 169 (type *helena*).

Compsosoma (not of Audinet-Serville, 1835) Duméril, 1853, Mem. Acad. Sci. France, xxiii, p. 453 (type *radiata*).

Epidea Hallowell, Pr. Acad. Nat. Sci. Philad. 1860, p. 488 (type *robusta*=*oxycephala*).

Phyllophis Günther, 1864, Rept. Brit. Ind. p. 295 (type *carinata*).

Allophis Peters, 1872, Mon. Akad. Berlin, p. 686 (type *nigricaudus*=*janseni*).

Spaniopholis Mocquard, 1897, Bull. Mus. Hist. Nat. Paris, iii, p. 216 (type *souliei*=*carinata*).

Radinophis Vogt, 1922, Arch. Natur. Berlin, lxxxviii, A, 10, p. 140 (type *melli*).

Coluber, Boulenger, F. B. I. 1890, p. 330, and Cat. Sn. Brit. Mus. ii, 1894, p. 24.

The above synonymy refers only to the Asiatic forms.

Maxillary teeth 14 to 24*, slightly enlarged anteriorly or posteriorly, head more or less elongate, distinct from neck; eye moderate or rather large, with round pupil. Body elongate, cylindrical or slightly compressed; scales* in 19 to

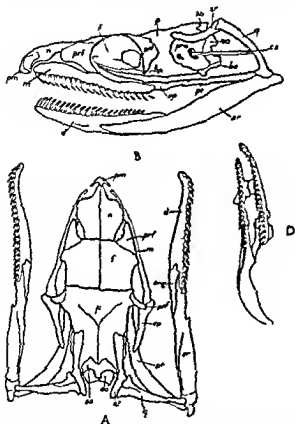


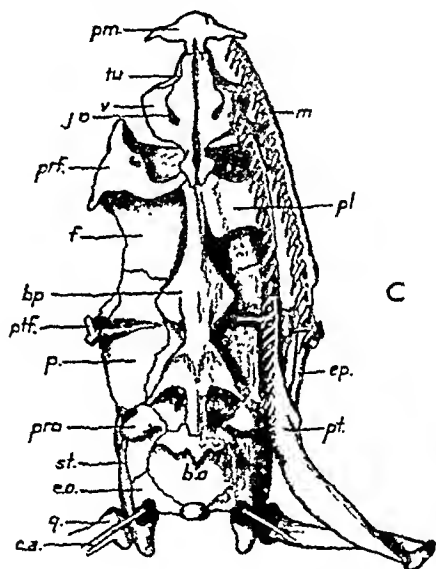
Fig 44.—*Elaphe radiata*. A. Dorsal. B. Lateral. C. Ventral view of skull. D. Palato maxillary arch (For C, see opposite page)
ang, angular; ar, articular; bo, basioccipital; bp, basisphenoid; ca, columella auris (or stapes); d, dentary; ep, ectopterygoid (or transpalatine); ex, exoccipital; f, frontal; j.o., foramen for naso palatine duct leading to Jacobson's organ; m, maxilla; n, nasal; p, parietal; pm, premaxilla; prf, prefrontal; pro, prootic; pt, pterygoid; ptf, postfrontal; q, quadrate; so, supraoccipital; st, suprastemporal; tu, turbinal; v, vomer

* For the species included in this work.

27 rows, with paired apical pits, smooth or keeled; ventrals rounded or angulate laterally; tail long, subcaudals paired.

Common characters unless otherwise stated:—nostril between two nasals; internasals shorter than the prefrontals; two anterior temporals; five infralabials in contact with the anterior genials, which are as long as or a little longer than the posterior, the latter usually separated from one another by one or more small scales.

The hemipenis is of the same type in all the species mentioned. It can be divided into three areas. Distally, it is calyculate, the cups being scalloped, with soft or spinous points; this is



succeeded by a spinose area, the spines being relatively large and few in number; they are thick and fleshy in appearance, the tip appearing as an uncovered point. The extent of the areas varies with the species; the sulcus is not forked.

Range. Europe; Asia and islands of the East Indies; North America. Some 30 species in Asia.

I cannot find any morphological characters by which to distinguish *Gonyosoma* Wagler 1828, type *viride* = *oxycephala*, from the species usually placed under *Elaphe* Fitzinger 1833. *Gonyosoma* therefore should stand as the name of the genus. Its limits, however, are not yet clearly defined, and fresh work upon it will probably result in further changes in nomenclature. Rather than add to the confusion, I leave *Elaphe* for the present as it stands.

Key to the Species

I Colour green (except in young *frenata* and sometimes in *oxycephala*)

Scales in 19 rows a loreal

Scales in 17 rows no loreal

Scales in 23 (2) rows

prasinus p 143

frenata p 144

oxycephala p 144

II Colour not green

A Loreal not very small

a Last labial below the eye touching the temporals* scales of the

unilobed region strongly keeled

Scales in 19 rows a black occipital bar

Scales in 19 rows no black occipital bar

Scales in 25 to 29 rows

subulata, p 146

flacolineata p 149

helena, p 149

b Last labial below the eye not touching the temporals

1 Scales of the subchindic region feebly keeled

Scales in 23 rows \ 236-240 a black stripe along the side of the head

Scales in 23 rows \ 233-247 no black stripe on the head

Scales in 21 rows \ 212-230

Scales in 27 rows

temura, p 150

hodgeoni, p 150

cantoni p 152

morillonendorfi p 153

2 All the scales except the outer 1 or 2 rows strongly keeled scales in 23 rarely 25 or 27 rows \ 215-229

3 Scales smooth in 19 rows

carinata p 154

porphyroceus p 154

B Loreal very small or absent belly with large quadrangular black spots

Scales in 19 rows a V-shaped mark on the top of the head

Scales in 21 or 23 rows; head with 3 black crescentic bands

leonardi, p 156

mandarina p 157

The following table of dental and scale counts will also assist in the identification of the species

	Max teeth	Scales	Ventrals	Caudals	Labials
<i>prasinus</i>	20-23	19	191-209	81-111	8
<i>frenata</i>	20-23	19	201-235	120-145	8-9
<i>oxycephala</i>	22-23	23 (25)	236-262	130-149	9
<i>radiata</i>	20-21	19	222-250	82-108	8-9
<i>flacolineata</i>	21-24	19	193-234	89-115	9
<i>helena</i>	18-20	25 (29)	217-265	73-100	8-11
<i>temura</i>	22-24	23 (25)	231-293	89-112	7-9
<i>hodgeoni</i>	21-22	23 (21)	229-247	79-92	8
<i>cantoni</i>	21-23	21	213-238	65-88	8
<i>morillonendorfi</i>	23	27 or 21	268-274	97-99	9
<i>porphyroceus</i>	20-24	19	190-218	52-78	8
<i>leonardi</i>	16-17	19	201-228	53-60	7
<i>mandarina</i>	14-18	21-23	210-240	62-80	7

* Insignificant as this character may seem I have not yet found it fail it has I believe taxonomic value

84. *Elaphe prasina*.

GREEN TREE RACER.

Coluber prasinus Blyth, 1854, J. A. S. Bengal. xxiii, p. 291 (Assam : Calcutta); Boulenger, F. B. I. 1890. p. 334, and Cat. Sn. Brit. Mus. ii, 1894, p. 59; Annandale, Rec. Ind. Mus. vi, 1911, p. 218; Venning, J. Bombay N. H. S. xx, 1910, p. 337; Wall, ibid. xix, 1909-1910, pp. 346, 825 and xxix, 1923, p. 620 and xxx, 1925, p. 812; Parker, Ann. Mag. Nat. Hist. xv, (9) 1925, p. 301; Rendahl, Ark. Zool. Sven. Vet. Akad. Stockholm, xxix, 10, 1937, p. 22.—*Elaphe prasina*, Smith, Bull. Raffles Mus. No. 3, 1930, p. 48, and Rec. Ind. Mus. xlii, 1940, p. 480; Pope, Rept. China, 1935, p. 260; Bourret, Serp. Indo-Chine, 1936, p. 208; Shaw and others, J. Darjeeling N. H. S. xiv, 1939, p. 71; Tweedie, Bull. Raffles Mus. No. 16, 1940, p. 85.

Gonyosoma gramineum Günther, 1864, Rept. Brit. Ind. p. 294, pl. xxiii, fig. D (Khasi Hills; London).

Posterior maxillary teeth largest. Snout twice as long as the diameter of the eye; internasals nearly as long as the prefrontals; loreal a little longer than high; preocular often touching the frontal; 9 supralabials, 4th to 6th touching the eye; 2 anterior temporals, rarely only 1. Scales in 19:19:15 rows, faintly keeled, except the outer two or three rows; smooth in the young; V. 191-209, with a strong lateral keel; anal single or divided; C. 91-111.

Hemipenis extending to the 9th caudal plate; the calyces are deeply scalloped, with spinous points; the spinose area is short and the spines are not fleshy; the proximal plicate area is long.

Uniform green above in the adult, the interstitial skin with black and white reticulations, the scales sometimes edged with black in the young; upper lip and lower parts greenish-white; ventrals outside the lateral keel usually white.

Total length: ♂ 900, tail 235; ♀ 1110, tail 250 mm.

Range. From the Eastern Himalayas (Darjeeling district) through Assam, Upper Burma and Yunnan to Tong-King (Col des Nuages) and south to the Malay Peninsula.

In Assam and Burma it ranges as far north as the Mishmi Hills and Sumprabum in the north of The Triangle, and south to Toungyi, S. Shan States. South of lat. 20° it appears to be extremely rare, and its distribution is somewhat remarkable. I obtained two specimens from Ban-na, Tourane, on the coast of Annam (Brit. Mus. Coll.), and specimens have been obtained in the mountains of the Malay Peninsula at between 4,000 and 5,000 feet altitude; there is a specimen in the Indian Museum (No. 7672) from the Andaman Islands. It has been recorded from all the main hill ranges in Assam and Upper Burma, but is nowhere common. Its obliterative coloration and arboreal habits may explain this.

85 *Elaphe frenata*

- Herpetodryas frenatus* Gray 1853 Ann Mag Nat Hist (2) xii, p. 320 (Khasi Hills London).—*Coluber frenatus* Boulenger F B I 1890 p. 335 and Cat Sn Brit Mus i 1894 p. 54. Wall J Bombay N H S xx x 1923 p. 670. Parker Ann Mag Nat Hist (9) xv 1925 p. 303.—*Elaphe frenata* Pope Rept China 1935 p. 244 fig head. Bourret Serp Indo-Chine, 1936 p. 266.
- Rhad nophis melli* Vogt 1922, Arch Nat Berlin, lxxviii, A. 10 p. 140 (Kwantung Prov Berlin). *Melli* ibid lxxviii, A. 10, 1922 p. 121.
- Gonyosoma erubescens* Schmidt 1923, Amer Mus Nov No 137 p. 4 (Yenping Shuen New York).

Closely allied to *E. prasina* differing as follows. Snout more projecting prefrontals twice as long as the internasals, nasals sometimes united into a single shield. 8 or 9 supra labials. loreal united with the prefrontal.

V 201 235 C 120-145 A 2

Hemipenis as in *prasina*.

Colour as in *prasina* but with a black streak along the side of the head above the labials.

Total length ♂ 1500 tail 465 mm (Col des Nuages Tong King).

Range Assam (Khasi Hills), Tong King (Chapa, Col des Nuages), Southern China. A much rarer snake than the preceding but not uncommon at Chapa according to Bourret.

Under the name of *melli* Vogt has described from Southern China a juvenile which is coloured quite differently from that of the adult. The upper parts are grey with numerous more or less oblique black transverse bars irregular in outline and often broken up. Whether this coloration is constant for all juveniles as Pope suggests remains to be shown, it is not impossible however that it represents a distinct colour form such as occurs in *E. arcycephala* and which is discussed more fully under that name.

86 *Elaphe arcycephala*.

RED TAILED RACER.

- Coluber arcycephalus* Boie 1827 Isis p. 537 (Java type lost). Boulenger F B I 1890 p. 335 and Cat Sn Brit Mus ii 1894 p. 56. Annandale J A S Bengal, 1905 p. 175. Wall & Evans J Bombay N H S xi 1901 p. 614. Wall ibid. xxx 1923 p. 670. Smith P Z B 1921 p. 476. Rendahl, Ark Zool Sven Vetakad, Stockholm, xxx, A. 10 1937 p. 22.—*Herpetodryas arcycephalus* Schlegel Plys Serp ii 1837, p. 189 pl. vii. figs. 6-9.—*Gonyosoma arcycephalum* Stoliczka, J A S Bengal xxxix 18 9 p. 193.—*Elaphe arcycephala*, Smith, Bull. Raffles Mus No 3 1930 p. 50; Bourret Serp Indo-Chine, 1936 p. 204, fig head.
- Gonyosoma erude* Wagler 18 8 Icon. Amph. pl. ix (Brazil).

- Alopecophis chalybeus* Gray, 1849, Ann. Mag. Nat. Hist. (2) iv, p. 247 ("Mauritius": London).
Epidea robusta Hallowell, 1860, Pr. Acad. Nat. Sci. Philad. p. 488 (Gaspar Straits, Malay Archipelago); Stejneger, Pr. U.S. Nat. Mus. lxxix (16), 1926, p. 3 (= *oxycephala*).
Coluber floweri Werner, 1925, Sitz. Ber. Akad. Wiss. Wien, Abt. I, cxxxiv, p. 55 (Singapore; Vienna).
Coluber janseni elegans Werner, 1926, Sitz. Ber. Wiss. Wien, cxxxv, I, 7/8, p. 244 (Siam; not seen by me).

Anterior maxillary teeth largest. Snout strongly projecting, nearly three times as long as the eye; loreal 2 to 3 times as long as high; 9, sometimes 10, supralabials, 5th and 6th, or 6th and 7th, touching the eye; anterior genials much



Fig. 45.—Hemipenis of *Elaphe oxycephala*.

longer and larger—3 or 4 times—than the posterior. Body strongly compressed; scales in 23, rarely 25: 23, rarely 25: 15 rows, smooth or feebly keeled. V. 236–262, strongly angulate laterally; C. 130–149; A. 2 (for specimens from the Indo-Chinese subregion). Some or all of the vertebrae in the posterior part of the body may be enlarged.

Hemipenis extending to the 21st caudal plate. The calyces are large and thick-walled but not deeply scalloped; spines very large and few in number; they are succeeded proximally by a short area of much smaller and more numerous spines (fig. 45).

Green above darkest on the head, tail light chestnut or buffish red the two colours meet abruptly at the vent. On the anterior half of the body the scales may be edged with black an indistinct blackish stripe along the side of the head immediately above the labials, light greenish yellow below.

Total length ♂ 1880 tail 480, ♀ 2100 tail 500 mm

Range Tenasserim (Amherst district), Siam (Kanburi Raheng district Chieng Sa in the extreme North), Cambodia and Cochin China (*vide* Tirant) S Annam (Daban), the Andaman and Nicobar Islands the Malay Peninsula and East Indian Islands. I do not know of any reliable evidence to show that this snake occurs in Upper Burma or anywhere north of the localities given here.

Under the name of *Coluber flowers*, Werner has described a distinct colour form. This variety is never green but has the head and body above of a light or dark buff marked all over with scattered irregular blotches of dark brown or black. the belly is whitish uniform or with dark markings similar to those upon the upper parts. the tail which is paler and uniform in colour is abruptly marked off from the body as in the typical form. This colour pattern is obviously produced by an extension throughout the body of the colour of the tail of the typical form with the addition of the dark markings. It inhabits the Malay Peninsula as far north as Trang.

A thoroughly arboreal snake extremely active, and swift in its movements, the few that I have handled never became tame and were always ready to bite at the slightest provocation. According to Stoliczka it is not uncommon in the forests of the Andaman Islands and is found generally on bushes near brackish water creeks.

87 *Elaphe radiata*

COPPERHEAD

- Rumohr, Inl Serp. 2, 1801 pl. xlv p. 44 (Java)
Coluber radiatus Schneider 1837 *Ihyæ Serp.* v p. 135 pl. v
 figs 5 & 6 (Java. Le lon) Badenger F B I 1800 p. 333
 and Cat. Sn. Brit Mus. i 1891 p. 61 Smith J Nat Hist
 Soc Siam 1 1914 p. 9, pl. Wall J Bombay N H S xix
 1910 p. 803 and xx 1914 p. 206 fig. head and xxix 1903
 p. 61.—*Coleonyx radiatus* Cochran Proc U S Nat Mus
 lxxv 1910 p. 6.—*Ekyle radiata* Pope Rept China, 1935
 p. 61 fig. head. Bourret Serp. In to Chine 1936 p. 211
 Shaw & others J Durrel og N H S xiv 1939 p. 73
Coluber quadrifasciatus Cantor I 7 S 1871 p. 51 (Assam col
 sketch in Bodleian Library)
Tropidonotus sp. q. Cantor l c x p. 54 (Mergui Tenasserim
 London col sketch in Bodleian Library)

Posterior maxillary teeth largest. Snout twice as long as

the eye ; loreal a little longer than high ; 9, rarely only 8, supralabials, 4th to 6th touching the eye, 6th in contact with the temporal. Scales in 21 or 19 : 19 : 17 rows, more or less distinctly keeled, those of the ischiadic region strongly keeled. V. 222-250, strongly angulate laterally ; C. 82-108 ; A. 1.

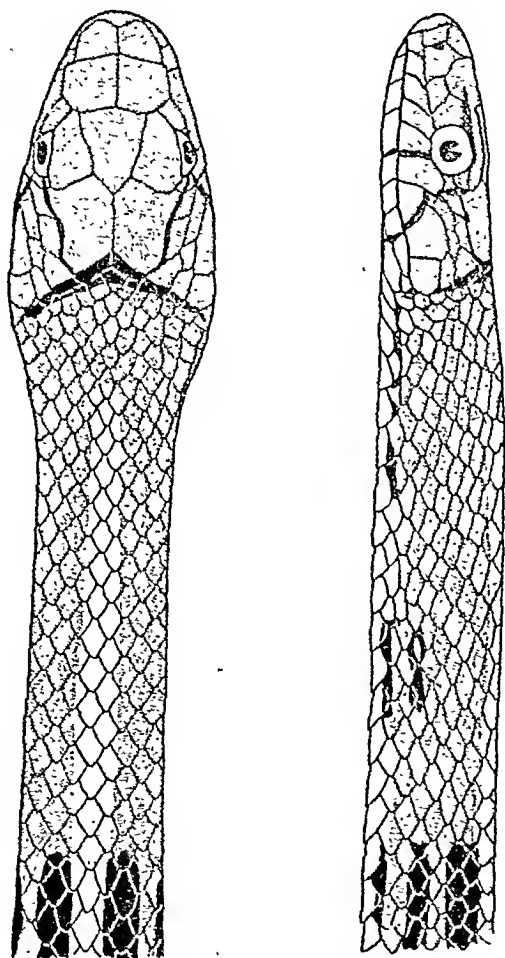


Fig. 46.—*Elaphe radiata*. (B.M. 94.5.21.1)

Hemipenis extending to the 10th caudal plate ; the calyces are deeply scalloped, with blunt spines ; the spinose area is extensive and is succeeded proximally by a short one of small stout spines.

Above greyish brown, fawn or yellowish-brown, sometimes with a reddish or greenish tinge in life, with four black stripes on the anterior half or two thirds of the body, commencing a short distance behind the neck; the upper pair, on either side of the vertebral line, are broad, the outer pair on each row 3 are much narrower and are usually broken into a series of elongated spots on the anterior part of the body, bordering the ventrals there may or may not be a 3rd series of still smaller spots, lower parts yellowish, uniform, or powdered with grey, or almost entirely grey; head copper brown, a black bar across the occiput and three black streaks radiating from below and behind the eye

Total length ♂ 1890, tail 370, ♀ 1795, tail 350 mm. (♂ 2135 mm, Wall)

Range From Orissa (Cuttack) and the Eastern Himalayas (Sikkim) to Southern China, and through the whole of the Indo-Chinese subregion to the Malay Archipelago

E. radiata is not uncommon in Southern Burma, Siam, and French Indo-China, it is found chiefly in the plains, inhabiting the open country and fields, and gardens in the vicinity of villages. It is diurnal in its habits and feeds chiefly upon small mammals. It possesses in a marked degree the power of expanding, in a vertical direction, the throat and anterior part of the body. When cornered, it adopts a menacing attitude throwing the fore part of its body into a series of loops and opening the mouth widely. Under these conditions it is extremely handsome, the jet black bars contrasting vividly with the pale fawn of the rest of the body. One that I kept never grew accustomed to being handled, and after four months was nearly as wild and fierce as on the day it was captured. Young ones that I have kept were more gentle and soon became tame.

From 5 to 12 eggs are laid at a time.

88 *Elaphe flavolineata*.

Coluber flavolineatus Schlegel, 1837, *Phys. Serp.* ii, p. 14. (Java).
Stejneger *Nyt Mag. Naturvid. Kristiana*, ix, 1922 (2) p. 78

Coluber melanurus (non Shaw 1802) Schlegel, 1837, *Phys. Serp.* ii, p. 141, pl. v fig. (Java), Boulenger, *F. B. I.* 1890, p. 334, and *Cat. Sn. Brit. Mus.* ii, 1894, p. 60, Annandale, *J. A. S. Bengal (n.s.)* i, 1905, p. 173, Wall, *J. Bombay N. H. S.* xxx, 1923, p. 261, Smith, *Bull. Raffles Mus.* No. 3, 1930, p. 48

Posterior maxillary teeth largest. Snout twice as long as the eye, loreal a little longer than high, 9 supralabials, 4th to 6th touching the eye, 6th in contact with the temporal. Scales in 21 or 19-19 rows, more or less distinctly keeled, those of the ischiadic region strongly keeled, V 193-234, strongly angulate laterally; C 89-115, A 1

Hemipenis extending to the 14th caudal plate ; the calyculate area occupies more than half the organ ; distally the calyces are small and uniform in size ; they gradually become larger and more elongate as they approach the spinose area ; this latter is relatively short, and the spines are few in number ; they terminate in a series of small spines.

Pale brown anteriorly, with a yellow, black-edged vertebral stripe which becomes gradually more and more indistinct towards the hinder part of the body ; this, like the tail, is darker brown or black ; a series of black spots on each side of the anterior part of the body, or ocelli with bright yellow centres well marked in the young ; a black streak below the eye, an oblique one from the eye to the angle of the mouth, another from the temple to the neck.

Total length : ♂ 1560, tail 360 mm.

Range. A Malayan species that just reaches the Indo-Chinese region in Tenasserim ; it is recorded from the Andaman Islands. Oviparous, the eggs measuring approximately 50 by 20 mm. in size.

The *Coluber melanurus* of Schlegel, 1837, is antedated by the *Coluber melanurus* of Shaw, 1802, which is a species of *Callophis*.

89. *Elaphe helena*.

TRINKET SNAKE.

Russell, 1796, Ind. Serp. i, p. 37, pl. 32 (*Vizagapatam*).

Coluber helena Daudin, 1803, Hist. Nat. Rept. vi, p. 277 (based on Russell's plate) ; Boulenger, F. B. I. 1890, p. 331, and Cat. Sn. Brit. Mus. ii, 1894, p. 36 ; Wall, J. Bombay N. H. S. xvi, 1905, p. 394, and xix, 1909, p. 757, and xxii, 1913, p. 22, col. pl., and xxvi, 1919, p. 566, and xxix, 1923, p. 622, and Sn. Ceylon, 1921, p. 197, and Spol. Zeyl. xiii, 1924, p. 78, figs. ; Fraser, J. Bombay N. H. S. xxxix, 1937, p. 478.—*Elaphe helena*, Shaw & others, J. Darjeeling N. H. S. xiv, 1939, p. 78.

Cynophis bistrigatus Gray, 1849, Ann. Mag. Nat. Hist. (2) iv, p. 246 (Ceylon ; London).

Herpetodryas malabaricus Jerdon, 1854, J. A. S. Bengal, xxii p. 530 (Annamallays ; London).

Herpetodryas malabaricus var. *carinata* Müller, 1878, Verh. Nat. Ges. Basel, vi, p. 671 (Bangalore ; Basel).

Anterior maxillary teeth largest. Snout twice as long as the eye ; prefrontals twice, or nearly twice, as long as the internasals ; loreal a little longer than high ; 9 or 10, sometimes 8 or 11, supralabials, 5th and 6th, or 5th to 7th, touching the eye, the 6th or 7th in contact with the temporals. Scales in 23 or 25 : 25 or 27 (rarely 29) : 21 or 19 rows, more or less distinctly keeled on the posterior part of the body and tail. V. 217–265, angulate laterally ; C. 73–100 ; A. 1.

Hemipenis extending to the 27th caudal plate ; the distal

half of the organ is spinose the spines being relatively small and arranged in longitudinal series, this area changes abruptly into one with very large spines there are from 6 to 8 of them in lateral series the largest ones being on either side of the sulcus (specimen from Madras B M Coll)

Light or dark brown above with dark brown or black cross bars containing white ocelli these are most conspicuous anteriorly and on the sides more than on the back, this pattern gradually disappears on the hinder part of the body, which is brown above with a broad dark stripe on each side, a black vertical streak below the eye and an oblique one behind it lower parts yellowish uniform or with a more or less distinct fawn red marking on each side This marking, according to Wall is confined to specimens from Western India south of Bombay

Two distinct forms of colour pattern can be found on the neck I Two longitudinal black stripes parallel with one another or converging posteriorly This is the commonest form and occurs throughout the whole range of the species. II No black stripes but a white black edged collar interrupted on the mid line Apparently restricted to the Western Ghats

Total length ♀ 1340 tail 290 ♂ 900 tail 200 mm

Range Ceylon Peninsular India to Sind in the North West the Himalayas (Morora district Jalpaiguri district), Assam (Naga Hills)

Wall (1913 and 1921) has given good accounts of this well known Indian snake and his colour plate is excellent All those who have had experience of it agree that it is an extremely active creature with a vicious temper Its main food consists of mammals but lizards frogs and snakes have been recorded as part of its fare When excited it will assume an attitude of defence similar to that adopted by *E. radiata* As regards its breeding habits Wall (1924) records finding eggs in June the embryos well advanced in development

90 *Elaphe taeniura*

STRIPED RACER

- Elaphe taeniura* Cope, 1861 Proc Acad. Nat. Sci. Philad. iii, p. 565 (Nagpo and Ram) — *Coluber taeniurus* Boulenger P. B. L. 1890 p. 333 and Cat. Sn. Brit. Mus. i, 1894 p. 47 and Rept. Malay Peninsula, 1912 p. 142 Annandale Rec. Ind. Mus. vii, 1912 p. 48 and J. A. S. Bengal ix, 1913 p. 409 Yenning, J. Bombay N. H. S. xx, 1910 p. 338 Wall ibid. xix, 1909 p. 346 and xxx, 1923 p. 67 — *Elaphe taeniurus* Pope Rept. China, 1935 p. 271 fig. head Bourret Serp. Indo-Chine 1936 p. 195 Smith, Rec. Ind. Mus. xxxii, 1935 p. 239 and xlii, 1940 p. 480 Shaw & others, J. Darjeeling N. H. S. xiv, 1939, p. 76

- Coluber nuthalli* Theobald, 1868, Cat. Rept. Mus. Asiat. Soc. p. 51, and Cat. Rept. Brit. India, 1876, p. 164 (Pegu, Burma; Calcutta); Selator, J. A. S. Bengal, ix, 2, 1891, p. 239 (= *taniurus*).
Elaphis yunnanensis Anderson, 1879, Anat. Zool. Res. Yunnan, p. 813 (Tengyueh, Yunnan; Calcutta and London).
Elaphis grabowskyi Fischer, 1885, Arch. Nat. Berlin, p. 59, pl. iv, fig. 3 (Borneo; London).—*Elaphe taniura grabowskyi*, Smith, Bull. Raffles Mus. No. 3, 1930, p. 49.
Coluber vaillanti Mocquard, 1905, Bull. Mus. Hist. Nat. Paris, xi, p. 76 (Cao-bang, Tong-king; Paris).
Coluber taniurus var. *ridleyi* Butler, 1899, J. Bombay N. H. S. xii, p. 426 (Batu Caves, Kuala Lumpur, Malay Peninsula); Ridley, 'The Times,' Nov. 10, 1937.
Coluber taniurus pallidus Rendahl, 1937, Ark. Zool. K. Sven. Vet Akad. Stockholm, xxix, A, p. 19 (Sukli, Tenasserim).

Anterior maxillary teeth largest. Snout $2\frac{1}{2}$ times as long as the eye; prefrontals twice or nearly twice as long as the internasals; loreal a little longer than, sometimes nearly twice as long as, high; 7 to 9 supralabials, 2 or 3, sometimes only one, touching the eye: a presubocular usually present. Scales in 23:23:19 rows in 22 examples from the Indo-Chinese region north of lat. 20° ; in 25:25:19 rows in examples from Siam and Tenasserim, smooth or feebly keeled. V. 231-263; C. 89-112, north of lat. 20° ; V. 276-293; C. 91-103 from Siam, strongly angulate laterally; A. 2. In two examples from Pangnandim the anterior subcaudals are single.

Pope (1935, p. 272) has shown how erratic and geographically inconsistent the scale-counts of this species can be. The Chinese form has usually 25 scales at mid-body, that from the Malay Peninsula always 25 at mid-body*, while further south in the Malay Archipelago it may rise to 27. The great diversity in the ventral counts in specimens from the Indo-Chinese region alone is shown here.

Hemipenis extending to the 15th caudal plate. The calyculate area occupies nearly half the organ: the spines are short and are enclosed in a voluminous sheath. They are succeeded proximally by an area of longitudinally plicate folds; the transition between each area is abrupt.

Light greyish or brownish above, the head and neck uniform except for a black stripe on each side of the head, broadest behind the eye; anterior part of the back with a vertebral series of large black butterfly-shaped spots, and smaller diamond-shaped ones on the sides, in the young, which in later life break up to form a wide open network; posterior part of back with a pale grey vertebral stripe, 3 or 4 scales wide, and a broad black stripe on each side, 5 or 6 scales wide: this may or may not be interrupted by light spots or transverse bars as far as the vent; lower parts uniform yellowish (spotted

* As far as my own observations go.

with black in specimens from Upper Burma and S.E. Tibet), outer margins of the ventrals with black spots, which on the hinder part of the body and tail unite to form a stripe; it is separated by a white stripe from the dark lateral one

Total length ♂ 1600, tail 300, ♀ 1980, tail 340 mm

Range in the Indo-Chinese region: Darjeeling; Burma (Abor country, Rong to Valley north of Rima, Pangnamdum, north of Fort Hertz, Chin Hills, Pakkoku district); Tenasserim (Sukli) Tong King, Hong Kong, Siam (Muang Fang in the north, Hinlap in the Dong Rak Mts)

The pale form of this snake, var *redleyi*, first described from the Batu Caves of the Malay Peninsula, no doubt owes its lack of coloration to the environment in which it lives. It feeds upon bats

91 *Elaphe hodgsoni*

Spilotes hodgsoni Günther 1860, P Z S p 136 pl 27 (Nepal, London).—*Coluber hodgsoni* Boulenger, F B I 1890, p 332, and Cat Sn. Brit Mus li 1894, p 35, Wall, J Bombay N H S xxix, 1923, p 622.—*Elaphe hodgsoni*, Shaw & others, J Darjeeling N H S xiv, 1939, p 75

Anterior maxillary teeth largest. Snout $2\frac{1}{2}$ times as long as the eye, prefrontals twice or nearly twice as long as the internasals, loreal a little longer than high, 8 supralabials, 4th and 5th touching the eye, a presubocular, often united with the 3rd labial. Scales in 21 or 23-23 17 rows, smooth or feebly keeled. V 229-247, strongly angulate laterally, C 79-92, A 2

Hemipenis extending to the 13th caudal plate, otherwise as in *lanceata*

Olive-brown above, many of the scales edged with black; yellowish below. The outer margins of the ventrals edged with black.

Total length ♂ 1500, tail 310, ♀ 1250, tail 255 mm

Range The Himalayas, from Ladak and Kashmir (Srinagar) to Sikkim, Assam (Garó Hills)

92 *Elaphe cantoris*.

Coluber reticulatus (non Daudin 1803) Cantor, 1839, P Z S p 81 (Cheerapunji, Assam, col sketch in Bodleian Library); Boulenger, F B I 1890, p 332

Coluber cantoris Boulenger 1894, Cat Sn. Brit Mus li, p 35, Wall, J Bombay N H S xix, 1909 10 pp 345 398 and xxix, 1923, p 621.—*Elaphe cantoris* Shaw & others, J Darjeeling N H S xiv, 1939, p 74, Smith, Rec Ind. Mus xlii, 1940, p 480

Anterior maxillary teeth largest. Snout 2 to $2\frac{1}{2}$ times as long as the eye, loreal a little longer than high, 8 supralabials, 4th and 5th, or 3rd to 5th, touching the eye, a

presubocular usually present. Scales in 19 or 21:21:17 rows, smooth or feebly keeled. V. 213-236, angulate laterally; A. usually single; C. 65-88.

Hemipenis extending to the 17th caudal plate; characters as in *radiata* but the calyculate area more extensive.

Anterior half of the body grey, the interstitial skin and margins of the scales white, and with large squarish black spots, the vertebral series usually united to form broad transverse bars; posterior part of body and tail olive-brown to blackish, with irregular light cross-bars (reddish-brown in life) expanding on the vertebral line; lower parts yellowish, pink on the tail, spotted with brown or black or nearly entirely dark brown or black; head above uniform brown or greyish. The colour pattern is very distinct in the young and half-grown, but may disappear almost entirely in old individuals.

Total length: ♂ 1960, tail 335 mm. (not quite complete).

Range. The Eastern Himalayas (Sikkim; Darjeeling district); Assam (Garo and Khasi Hills); Upper Burma (Pangnamdim, north of the Triangle).

Common, according to Wall, in the neighbourhood of Darjeeling above 5,000 feet altitude.

93. *Elaphe moellendorffi*.

Cynophis maellendorffi Boettger, 1886, Zool. Anz. Jena, xi, p. 520 (Kwangtung Prov., China; Frankfurt).—*Coluber maellendorffi*, Boulenger, Cat. Sn. Brit. Mus., ii, 1894, p. 56.—*Elaphe maellendorffi*, Pope, Rept. China, 1935, p. 250, pl. x; Bourret, Serp. Indo-Chine, 1936, p. 202.

Elaphe moellendorffi tonkinensis Bourret, 1934, Bull. Gen. Instr. Pub., Hanoi, April, p. 11, and Serp. Indo-Chine, 1936, p. 203 (Tong-King; Paris).

Snout three times as long as the eye; prefrontals twice as long as the internasals; loreal twice as long as high; 9 or 10 supralabials, 5th and 6th touching the eye; a presubocular present or absent. Scales in 27:27 or 31:23 rows, more or less distinctly keeled. V. 268-274, strongly angulate laterally; C. 97-99; A. 2.

"The hemipenis is spinous proximally, calyculate distally, the calyculate area somewhat the more extensive and set off abruptly from the spinous section; the spines are numerous and uniform in size, but the calyces become much smaller towards the end of the organ; their edges are scalloped; distally the sulcus lies deep in a distinctly raised calyculate ridge, while a second longitudinal ridge parallels the one in which the sulcus is imbedded, but is evident only along the distal third of the organ" (Pope, 1935.).

Greyish above with a dorsal series of large dark grey, black-edged hexagonal or squarish spots, 28 to 32 in number, and a lateral series of alternating smaller ones; yellowish

below largely chequered with black tail with more or less complete whitish annuli (? pink in life) head uniform grey above

Total length ♂ 1000 tail 595 mm

Range Tong King (Cai Kim*) Southern China

Bourret's *tonkinensis* is based on two specimens which have 31 scale rows at mid body Their exact provenance in Tong King is not known and he remarks of them (p 204)

Je ne sais s'il s'agit d'une variété locale The specimen from Cai Kim said to be from Tong King in the British Museum and two others in Paris from Tong King have only 27 scale rows at mid body

94 *Elaphe carinata*

Hylophis ornatus Cuvier 1804 Rept Brit Ind. p 298 pl. xxi (China London) *Elaphe carinata* Pope Rept China, 1923, p 22 pl. xvii B and text fig.

Elaphe carinata ornitophaga Bourret 1936 Serp Indo-China p 9 fig. head Chapa, Tong King not seen by me

Colder *pylophus* Boulenger 1891 Ann. Mag. Nat. Hist. (6) vii. p 240 (China London) and Cat. Sn. Brit. Mus. 1894 p 53

Bourret records a specimen of this snake known previously from Yunnan and China from Chapa Tong King It differs from the typical form in having a scale formula of 25 25 19 V 22 C 95 and slightly in coloration

95 *Elaphe porphyracea*

Causler porphyraceus Cantor 1839 P. Z. S. p 51 (fishmarket, Amoy) color sketch in Bodleian Library; Günther Rept. Brit. Ind. 1864 p 239 pl. xx fig. head Boulenger Cat. Sn. Brit. Mus. 1894, p 24 Wall, J. Bombay N. H. S. xv: 1908 p 328 and xix 1909 10 pp. 345 827 and xxix, 1923 p 670 a d xxx, 1925 p 812 Rendahl, Ark. Zool. K. Sven. Vet. Akad. Stockholm, xxix, 1, 1937 p 16—*Abolobes porphyraceus* Boulenger F. B. 1 1890 p 304 Wall & Evans J. Bombay N. H. S. xii, 1907 p 611 Vourong ibid. xx 1910 p 337—*Elaphe porphyracea*, Smith, Bull. Raffles Mus. No. 3 1930 p 43 Pope Rept. China, 1935 p 253 fig. head Bourret Serp Indo-China 1936 p 187 Shaw & others J. Darjeeling N. H. S. xiv 1939 p 72

Elaphe porphyracea porphyracea Smith, Rec. Ind. Mus. xi, 1940 p 499

Coronella callisephalus Gray 1853 Ann. Mag. Nat. Hist. (2) xii p 390 (Khas Hills London)

Elaphe porphyracea pulchra Schmitt 1925 Amer. Mus. Nov. No. 175 p 3 (North of Yunnan fu New York)

Pannomphus nigrolineatus Cantor L. c. x p 63 ("Singapore" London)—*Elaphe porphyracea nigrolineata*, Pope Rept. China, 1935 p 257 Greaves & Pekin Nat. Hist. Bull. xv 1941 p 190

Elaphe porphyracea hainana Moll, 1929, Lingnan Sci. Journ. vii, p. 209 (Hainan).

Elaphe porphyracea longilineata Bourret, 1934, Bull. Gen. Instr. Pub., Hanoi, Dec. p. 6, and Serp. Indo-Chine, 1936, p. 191 (Tong-King : Paris).

Anterior maxillary teeth largest Snout $2\frac{1}{2}$ times as long

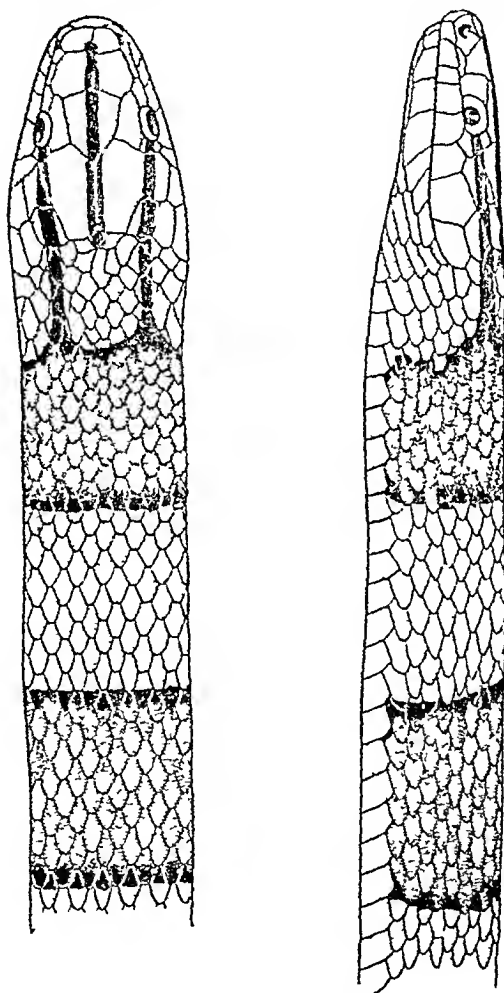


Fig. 47.—*Elaphe porphyracea*

as the eye ; loreal a little longer than high ; 8 supralabials, 4th and 5th touching the eye. Scales in 19 : 19 : 17 or 15 rows, smooth V. 190-218, not angulate laterally ; C 52-76 : A. 2.

Hemipenis to the 8th caudal plate. It is spinose throughout, the spines gradually increasing in size as they approach the base of the organ. At the extreme base there are a few very large ones. Extending the whole length of the organ on either side of the sulcus are two prominent folds, they are covered with spines and terminate at the tip in a partly free end which lies in a small recess or pocket. This description of the hemipenis drawn up from a Burmese example *forma typica* differs considerably from that given by Pope taken from a Chinese specimen (*p. nigrofasciata*). I have checked up my description with a specimen of the latter but cannot find that it differs in any material respect.

Total length ♂ 900 tail 140 ♀ 1100, tail 175 mm

There are two races.

I *Elaphe porphyracea porphyracea*

Pale to deep reddish brown above with broad dark brown, black-edged cross-bars (14 to 16+3 to 4 in number) which narrow on the sides of the body. In the young they are entirely black and are edged with white. On the hinder part of the body and tail they are often obliquely placed and may be reduced to large spots. Two black parallel dorso-lateral lines usually present on the hinder part of the body and tail, a black stripe down the middle of the head and another on each side usually connecting with the first transverse mark on the neck. Lower parts uniform yellowish.

Range Eastern Himalayas (Sikkim Darjeeling district), Assam (Abor country, Sadiya Garo and Khasi Hills) Burma (Nam Tanai Valley north of Fort Hertz, Mogoke, Toungyi, Chin Hills) Yunnan W China N Siam (Doi Sutep and Doi Ang Ka) the Malay Peninsula Sumatra

II. *Elaphe porphyracea nigrofasciata*

Differs in having fewer cross-bars (9-12) and in that the black dorso-lateral lines usually extend the whole length of the body.

Range Tong King S China, Hainan, Lantao I near Hong Kong

96 *Elaphe leonardi*

Coluber leonardi Wall, 1891 J. Bombay N. H. S. xxviii, p. 43, pl. and correction slip (Sinhga Kaba, Upper Burma London), and xxix, 1923, pp. 467-671. Readahl, Ark. Zool. K. Sven. Vet. Akad. Stockholm, xxix A, 1937 p. 19. — *Elaphe leonardi*, Bourret, Serp. Indo-Chine 1935, p. 191.

Elaphe leonardi leonardi, Smith, Rec. Ind. Mus. xlii, 1940 p. 481.

Elaphe leonardi chapaensis Bourret, 1934 Bull. Gen. Instr. Pub. Hanoi, March, p. 7 (Chapa, Tong King Para) and Serp. Indo-Chine, 1935, p. 192, fig. head.

Anterior maxillary teeth largest, snout twice as long as the eye. No loreal, the posterior nasal in contact with the

preocular; 7 supralabials, 3rd and 4th touching the eye; 1 or 2 anterior temporals. Scales in 19:19:17 rows, smooth; V. 201-226, feebly angulate laterally; C. 53-60; A. 2.

Hemipenis extending to the 10th caudal plate; the extreme tip is calyculate, the rest of the organ spinose, the spines being arranged in more or less distinct longitudinal series; distally they are small; they gradually increase in size and proximally are few in number and very large.

Two races can be distinguished.

I. *Elaphe leonardi leonardi*.

One anterior temporal. Olive-brown above, the scales finely edged with black, and with a series of large, buff, black-edged cross-bars or transversely placed spots; they are irregular in outline and are more or less confluent with smaller, similarly coloured spots on the sides of the body; yellowish below, with large black spots; head light-brown or buff in the young, darker in the adult, with a large, elongated, black, V- or U-shaped mark on the vertex starting on the prefrontal shields, its apex at the nape; a dark vertical stripe below the eye; another behind it, and two more that pass backwards from the eye and unite with the markings on the neck.

Total length: ♂ 810, tail 125 mm.

Range. Upper Burma. Patsarlamdan, long. 98° 10', lat. 27° 38'; Sinlun Kaba, Kachin Hills, Kambaiti. Six specimens are known.

II. *Elaphe leonardi chapaensis*.

Usually 2 anterior temporals. The dorsal spots are replaced by transverse or obliquely placed cross-bars which expand on the sides of the body where they may enclose a black spot.

Bourret gives a lower caudal count (40 to 55) for this form; in the two examples examined by me in Paris, the tails are incomplete.

Range. Chapa, Tong-King.

97. *Elaphe mandarina*.

MANDARIN SNAKE.

Coluber mandarina Cantor, 1840, Zool. Chusan, p. 483. pl. xii, and Ann. Mag. Nat. Hist. ix, 1842, p. 483 (Chusan I.; London); Boulenger, Cat. Sn. Brit. Mus. ii, 1894, p. 42; Parker, Ann. Mag. Nat. Hist. xv (9) 1925, p. 304.—*Elaphe mandarina*, Pope, Rept. China, 1935, p. 246, pl. x; Bourret, Serp. Indo-Chine, 1936, p. 194, fig.; Smith, Rec. Ind. Mus. xxxvii, 1935, p. 239, and xlii, 1940, p. 481.

Ablabes pavo Annandale, 1912, Rec. Ind. Mus. viii, p. 47, pl. v, fig. 3 (Upper Rotung, Abor country; Calcutta); Prater, J. Bombay N. H. S. xxvi, 1919, p. 683.—*Coluber pavo*, Wall, ibid. p. 865, and xxix, 1923, p. 621.

Holarchus roulei Angel & Bourret, 1933, Bull. Soc. Zool. Fr. lviii, p. 135 (Chapa, Tong-King; Paris).

Posterior maxillary teeth largest. Snout twice as long as the eye. loreal very small or absent united with the prefrontal. 7 supralabials 3rd and 4th touching the eye, 1 or 2 anterior temporals. Scales in 23-23 or 21-10 or 17 rows smooth. V 210-240 feebly angulate laterally, C 62-80, A 2.

Hemipenis extending to the 14th caudal plate, the calcu-
lite area occupies about half the organ the edge being deeply
scalloped. this area merges gradually into a spinose one the
basal spines being few in number and very large, at the
extreme tip of the organ are two small recesses one of which
is occupied by a papilla like process similar to that which is
found in *porphyrodon*.

Light brown or greyish above with a series of large oval
or rounded yellow spots broadly edged with black, there
are 22 to 25 on the body in specimens from Tong King 29
or 30 in specimens from Upper Burma, on the tail the central
parts of the spots may disappear and be replaced by black
annuli yellowish below with large black quadrangular spots
which unite or alternate with one another, head above with
black markings namely a band across the snout a crescentic
mark on the top of the head passing through the eye where
it divides into two and a V shaped mark, its apex on the
frontal shield and passing back on the side of the head behind
the mouth to the throat.

I have no hesitation in uniting *Ablabes parv* with this
species.

Total length ♂ 1600 tail 300 mm.

Rang Upper Burma (Abor country, Nam Tama Valley)
Tong King (San Si Pan Mts Col des Nuages), Southern
China.

According to Bourret it is not rare at Chapa and has been
found also at other places in the mountains of Tong King.

Genus PTYAS

RAT SNAKES

Ptyas Fitzinger 1843 Syst Rept p 26 (type *Coluber blumen-
bachii*) Wall J Bombay N H S xxix 1023 p 616 (in part)
Lope Rept China, 1935 p 235
Zamenis Boulenger F B I 1894 p 324, and Cat Sn. Brit Mus
i 1893 p 279 (in part)

Maxillary teeth 20 to 28 forming a continuous series
increasing in size posteriorly. Head elongate, distinct from
neck, eye large with round pupil normally two or three
loreal shields a presubocular. Body elongate cylindrical,
scales in 17 (18) or 15 (16) rows at mid body with a pical pits,
tail long subcaudals paired.

Common characters, unless otherwise stated:—Loreal region concave; nostril large, between two nasals; internasals shorter than the prefrontals; 1 pre- and 2 postoculars; 8 supralabials, 4th and 5th touching the eye; temporals 2+2;

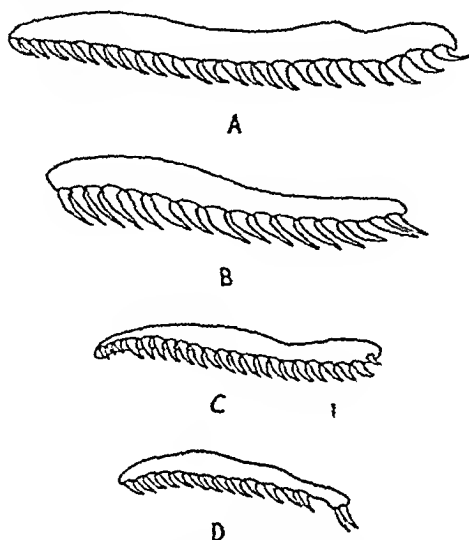


Fig. 48.—Maxillary bones of A. *Ptyas mucosus*; B. *Coluber diadema*; C. *Ophedrys major*; D. *Coluber fasciolatus*.

posterior genials longer than the anterior, in contact with one another anteriorly; anal divided. A single loreal shield has been recorded occasionally in both species.

Range. The Oriental Region.

Key to the Species.

Scales in 17 or 16 rows at mid-body; V. 190–213 .. *mucosus*, p. 159.
Scales in 15 rows at mid-body; V. 160–187 *korros*, p. 162.

98. *Ptyas mucosus*.

DHAMAN; RAT SNAKE.

Coluber mucosus, Linn. Mus. Ad. Frid. i, p. 37, pl. 23, and Syst. Nat. Ed. 10, 1758, p. 226 (India: Stockholm); Russell, Ind. Serp. i, 1796, p. 40, pl. 34; Andersson, K. Sven. Vet.-Akad. Handl. Stockholm, xxiv, 1899, iv (6) p. 25—*Ptyas mucosus*, Günther, Rept. Brit. Ind. 1864, p. 249; Wall, Sn. Ceylon, 1921, p. 172, and J. Bombay N. H. S. xxix, 1923, p. 617; Prater, ibid. xxx, (1) 1924, p. 169; Subrahmaniam, ibid. xxxvii, 1934, p. 743; Pope, Rept. China, 1935, p. 220; Fraser, J. Bombay N. H. S. xxxix, 1937, p. 475; Shaw & others, J. Darjeeling N. H. S. xiv, 1939, p. 68.—*Zamenis mucosus*, Boulenger, F. B. I. 1890, p. 324, and Cat. Sn. Brit. Mus. i, 1893, p. 385; Ferguson, J. Bombay

- N H S x, 1895, p 71 Beadon, ibid xx, 1910 p 408 Millard, ibid xvii, 1906 p 243 Venning ibid xx 1910, p 339 Millett, ibid xx 1909 p 758 Fenton, ibid xix, 1910 p 1002 Wall, ibid xvi 1906 ? p 259 col pl and p 1033 fig and xviii, 1907 p 113, and x x, (1909) p 6th and xxi, 1911 p 134; N'kol'sky Faune de la Russie in, 1916 p 79 McCann, J Bombay N H S xxxv i, 1934 p 409 Bourret Serp Indo-Chine, 1936 p 173.—*Zaocys mucronatus* Wall J Bombay N H S xxiii, 1914 p 188, and xxvi 1919 p 566
Coluber blumenbachii Merrem 1870 Tent Syst Amph b p 119 (Bengal)
Coluber dharmia Cantor 1839 P Z S p 51 (Bengal & Burma col sketch in Bodleian Library)
Leptophis trefrenatus Hallowell, 1860 Pr Acad Nat Sci Philad p 503 (Hong kong)

Maxillary teeth 20 to 25 Scales in 17 18 or 19 17 or 18 14 rows smooth or the median rows more or less distinctly keeled. V 190-213 sometimes with an obtuse lateral keel, C 100-146 A 2 The vertebrae may or may not be slightly enlarged

Hemipenis extending to the 10th-12th caudal plate not forked The distal one third is flounced the folds at the tip being much finer than those proximally this area is followed by one of almost equal length in which the flounces are much thicker walled and joined together in part to form calyces, it is succeeded abruptly by a spinose portion the spines being thick and fleshy and terminating in a apiculate there are 11 or 12 in lateral series at the base of the organ are two very large spines In addition the distal one half or one third is incompletely divided in two by invaginations of the external wall of the organ The connection between them is maintained by connective tissue and is intimately connected with the sulcus In general character the structure is that of *Zaocys carinatus* but the modifications are less developed

Olive green brown yellowish or greyish above with irregular but strongly marked black cross bars on the posterior half of the body yellowish white below the posterior ventrals (sometimes all the ventrals) and subcaudals edged with black lips and throat whitish the scales edged with black The young when born are pale olivaceous with more or less distinct light dark-edged cross-bars on the anterior half of the body In specimens from India the cross-bars on the posterior part of the body are set closer to one another and may form a reticulate pattern In occasional individuals (Chin Hills Toungyi Mandalay Andamans) the dark markings on the body are almost entirely absent, both above and on the belly Wall (1909) records that many specimens from Upper Assam are of a very dark colour being sepia or almost black, the dark markings in consequence being much obscured.

Total length ♂ 2250 tail 650 ♀ 1800 tail 450 mm Many larger individuals have been recorded Millard (1906) mentions a giant that measured 11 ft 9 in in length As

pointed out by Wall, males in general grow to a larger size than females.

Range. Ceylon; the whole of India to Baluchistan, Afghanistan, Turkestan and Chitral in the north-west; Kashmir and the Himalayas, the whole of Indo-China as far north as the Abor country, Yunnan and Southern China; Hainan; the Andaman Islands. I am unable to find any evidence that it occurs in Peninsular Siam or Tenasserim, south of lat. 13° N., or in the Malay Peninsula, but De Rooy (Rept. Indo-Austral. Arch. ii, 1917, p. 98) records it from Java and Sumatra.

The Dhaman or Common Rat Snake is widely distributed throughout the whole of India and Indo-China. Wall (1906

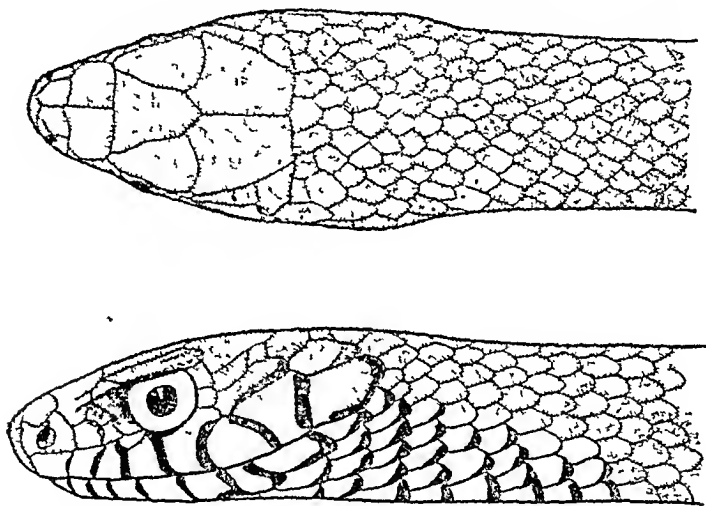


Fig. 49.—*Ptyas mucosus*. (B.M. 1910.9.6.8.)

and 1921) has given good accounts of the habits of this snake, and my own observations in Siam confirm his remarks. It is mainly an inhabitant of the plains, frequenting the open country, often in the vicinity of human habitations. It is a good climber, and is often found in trees at considerable heights. It is diurnal in its habits, and timid and excitable in disposition, but when cornered can put up a good fight, raising the forebody and throwing it into one or more curves, at the same time inflating the throat. Wall states that at this time it will give vent to a peculiar sound, something like the noise produced by a cat at bay. I have not observed it, although I have seen many individuals. Those that I have kept were always wild and excitable and never grew accustomed to being handled.

In spite of its name its main food is not rats, but frogs and toads but it is not particular in its choice of food and is prepared to devour almost anything that comes its way. Lizards of all kinds and occasionally snakes form part of its diet. In the trees it catches birds and their young and there is a record of its having attacked a full grown fowl. It does not constrict but overcomes such prey as mammals and birds by holding them down. Millard (in Wall 1906) states: "One of these (Rat Snakes) which we were keeping in the same cage as our Python caught a rat which was put in for food by the tail. The rat turned and bit the Dhaman severely and the Dhaman killed it by holding on to the tail and pressing the rat against the body of the Python and the floor of the cage. Several persons must have been brought to bear on the rat as a full size one was dead in 3 or 4 minutes." Ferguson (1910) commenting on its gluttony says that its favourite food is a medium sized frog of which a fair sized snake will eat of at 22 at a meal. This will last it a week.

Mating takes place in the hot weather May and June. Eggs 8 to 14 in number are deposited in August and September the young emerge between the end of September and December. The eggs measure $4 \times 50 \times 30-40$ mm in size, and the young when born 370-390 mm in total length.

The Dhaman is sometimes eaten by the country people both of India and Indo China. It is one of the few snakes in the Oriental region that is eaten by man. Its flesh is white and is said to taste not unlike that of chicken.

99. *Ptyas korros*

INDO CHINESE RAT SNAKE

- Coluber korros* Schlegel 1837 *Ptyas Serp* n. p. 139 and Albid Amphib. 1840 p. 99 pls. 77 28 figs 1-6 (Java, Leiden).
Ptyas korros Gunther Rept. Brit. Ind. 1864 p. 230. *Ptyas* Rept. Ch. in 1935 p. 217. *Bourret Serp. Indo-Chine* 1940 p. 16. Shaw & others *J. Daryelung N. H. S.* xiv 1839 p. 71. Smith Rec. Ind. Mus. xli, 1940 p. 481. (*Zamenis korros* Boulenger F. B. I. 1890 p. 324 and Cat. Sn. Br. Mus. i 1893 p. 394. Wall & Evans *J. Bombay N. H. S.* xii 1900-1901 pp. 357-620. Wall n. i. xix 1909 p. 622 and xix 1923 p. 618. Smith *J. Nat. Hist. Soc. S. Am.* i 1914 p. 94. Kopstein *Traubia* xi 1939 p. 391 fig. (eggs).
Ptyas korros chinensis Melli 1931 *Stz. Ber. Ges. Nat. Fr. Berlin* p. 39 (Kao shan, Kwangsi).
Ptyas korros indicus Melli 1931 *Lingnan Sci. J.* vii p. 203 (S. W. Yunnan).
 Loopell & L. Barbour 1910 *Pr. Bol. Soc. Washington* xv. 1 p. 189 (Buitenzorg Java). Dunn, *Amer. Mus. Nov.* No. 287 1927 p. 1 (=Lorros).

Maxillary teeth 23 to 28 Scales in 15 15 rarely 13 11
 rows smooth V 160-187 C 120-147, A 2

Hemipenis extending to the 10-12th caudal plate; the distal half is calyculate, the cups being feebly serrated and longer than broad; towards the basal end they are larger and much more thickly walled; this area passes abruptly into a spinous one, the spines being thick and fleshy and ending in a spicule; there are 6 or 7 in lateral series: at the base are two much larger spines; the sulcus lips are involved in the calyces.

Olivaceous-green anteriorly, browner posteriorly, the scales on the posterior part of the body edged or tipped with black; yellowish-white below, the outer margins of the ventrals and caudals sometimes edged with black. The young are olive-greenish with narrow white (yellow or pearl-coloured in life) cross-bars composed of series of spots. Some individuals have the scales on the posterior part of the body edged laterally with white, these markings showing up as pale longitudinal lines.

Total length: ♂ 2000, tail 680; ♀ 1435, tail 475. mm. (2198 mm. Wall).

Range. The Indo-Chinese region east of longitude 92°; in Assam as far north as the Mishmi Hills; in Upper Burma to lat. 28°; Yunnan; S. China; Hainan; Malaysia.

In its choice of haunts, food and disposition the Indo-Chinese Rat Snake is much like the Dhaman. It prefers, however, to live away from habitations and has strong arboreal tendencies, seeming to prefer life in bushes or on low trees rather than on the ground. In Bangkok it was not uncommon, but I found it only in one district, a small area covered with bushes, and during the wet monsoon. From the end of November, when the dry cool weather set in, until the rains commenced some time in April, it was never seen.

Genus ZAOCYS.

Zaocys Cope, 1860, Pr. Acad. Sci. Philad. p. 563 (type *Coluber dhumnades*); Boulenger, F. B. I. 1890, p. 329, and Cat. Sn. Brit. Mus. i, 1893, p. 374; Pope, Rept. China, 1935, p. 207; Bourret, Serp. Indo-Chine, 1936, p. 169; Werner, Zool. Jahrb. Jena, lvii, 1929, p. 74.

Zaocys (Zapyrus) Günther, 1864, Rept. Brit. Ind. p. 256 (type *fuscus*).

Ptyas, Wall, J. Bombay N. H. S. xxix, 1923, p. 616.

Maxillary teeth 20 to 33, increasing slightly in size posteriorly. Head elongate, distinct from neck; eye large, with round pupil; a presubocular. Body elongate; scales smooth or more or less distinctly keeled, with apical pits, in 16 or 14 rows at mid-body; ventrals rounded; tail long; subcaudals paired.

Common characters unless otherwise stated —nostril large between two nasals one large preocular not reaching the frontal 2 | stoculars temporals 2+2 posterior genials longer than the anterior in contact with one another anteriorly

Range Indo China China Malay Peninsula and Archipelago Philippines

6 species 2 in Indo China

Key to the Species

2 or 3 loreals
A single loreal

carinatus p 164
nigromarginatus p 165

100 *Zaocys carinatus*

Coryphodon carinatus Gunther (in part) 1858 Cat Col Sn Brit Mus p 112 (Borneo London) —*Zaocys carinatus* Gunther Rept Brit Ind 1864 p 256 Boulenger Cat Sn Brit Mus i 1893 p 377 and Ann. Mus C v Genova (2) xii 1893 p 374 Smith J Nat Hist Seram 1916 p 160 Joyntson, ibid vi 1927 p 314 Bourret Serp Indo Chine 1936 p 173 fig —*Ptyas carinatus* Wall J Bombay N H S xxxi 1946 p 66
Zaocys tenasserimensis Schaller 1891 J A. S. Bengal ix, p 238 pl 6 (Tenasserim Calcutta) —*Ptyas tenasserimensis* Wall J Bombay N H S xxx 1923 p 617

Maxillary teeth 22 to 26 internasals two thirds the length of the prefrontals 2-4 loreals 8-10 supralabials 4th and 5th or 5th and 6th touching the eye Scales in 18 16 or 14 12 rows the 4 to 6 median ones keeled V 208-215 C 110-118 A 2

Hemipenis extending to the 16th caudal plate not forked On the external wall of the organ and extending from about the middle nearly to the tip are two longitudinal fissures which extend deeply into it and nearly divide it into two the two parts are united to each other by connective tissue along which the sulcus spermaticus is conveyed On cutting into the hemipenis in the usual way the sulcus is exposed in the middle with the folds on each side These are spongelike in form but on close examination are found to be composed of closely set flounces transversely arranged distally they form smooth longitudinal folds which converge and meet at the tip proximally they are united and form large thick walled calyces the basal one-third has coarse spines 2 or 3 at the extreme base being very large

Olive brownish above anteriorly with or without black edgings to the scales and with or without a series of indistinct yellow cross bars the colour of which is mainly on the interstitial skin yellowish brown posteriorly with 6 black irregular longitudinal stripes connected together more or less distinctly to form a network tail black each scale with

a large central yellow spot; lower parts whitish anteriorly, black and yellow posteriorly; tail black, each caudal shield with a large semilunar yellow spot.

Total length: ♂ 3020, tail 730 mm. (about 12 ft. 3 in.).

Range. Tenasserim (Tavoy River); S. Burma (Karin Hills); Siam (Me Pow Forest, 20 miles E. of Muang Ngow, in the extreme north; Nakon-Sri-Tamarat Mts. in the Peninsula); Annam (Bana); the Malay Peninsula and Archipelago.

The largest of all the Asiatic Colubrids. All the specimens, 8 in number, that I have examined, are males.

Z. tenasserimensis differs from *carinatus* in having 7 and 8 supralabials respectively, one long shield touching the eye, and in having two anterior temporals, one above the other. I regard it as an aberrant individual in which fusion of the labials and temporals has produced this unusual set of characters. It is a juvenile and a female.

101. *Zaocys nigromarginatus*.

Coluber nigromarginatus Blyth, 1854, J. A. S. Bengal, xxiii, p. 290 (vicinity of Darjeeling; Calcutta).—*Zaocys nigromarginatus*. Günther, Rept. Brit. Ind. 1864, p. 257, pl. xxii. fig. B; Boulenger, F. B. I. 1890, p. 329, and Cat. Sn. Brit. Mus. i, 1893, p. 376; Wall, J. Bombay N. H. S. xviii. 1907, p. 325, and xix, 1909, pp. 344, 621; Pope, Rept. China, 1935, p. 214, figs.; Smith, Rec. Ind. Mus. xlii, 1940, p. 481.—*Ptyas nigromarginatus*, Wall, J. Bombay N. H. S. xxix, 1923, p. 617, and xxx, 1925, p. 812; Shaw & others. J. Darjeeling N. H. S. xiv, 1939, p. 70.

Zaocys dhumnades nigromarginatus Bourret, 1936. Serp. Indo-Chine, p. 172.

Maxillary teeth 22 to 26; internasals nearly or quite as long as the prefrontals; loreal longer than high; 8 supralabials, 4th and 5th touching the eye. Scales in 18 or 16: 16 or 14: 14 rows, the 4-6 median ones keeled. V. 190-209; C. 123-142; A. 2. Hemipenis as in *carinatus*.

Green above, the scales edged with black, with four broad, black, longitudinal stripes. In the young they extend the whole length of the body and tail, but in the adult are confined to the posterior one-third of the body; the dorsal pair, on each side of the vertebral line, are the broadest and are $2\frac{1}{2}$ scales wide, the lower $1\frac{1}{2}$ to 2 scales wide, border the ventrals; lower parts greenish-white; top of head brown.

Total length: ♂ 2260, tail 650 mm. (2560, tail 720, Bourret).

Range. The Eastern Himalayas (Nepal, Sikkim, Darjeeling); Assam and Upper Burma (Khasi, Kachin and Naga Hills and Pangnamdim in the Nam Tamai Valley); Tong-King (Chapa); Yunnan and Western China.

Found in the hills up to 7,000 ft. altitude.

The beauty of this snake in life has been well described by Wall (1907) "It is difficult to realise from the museum specimens the extreme beauty and brilliancy of colouring of many snakes in life, and this forcibly applies in the present instance. My specimen was a bright green of so soft a hue that the skin looked like velvet. This merged into a yellowish green anteriorly and yellow posteriorly, the latter merging into a rich black on the tail. The black margins to the scales served to enhance the beauty of the dorsal green. The head was olive brown with a bright yellow patch low on the temporal region. The chin and throat were white, sparsely speckled at first more heavily later, with light cerulean blue, which

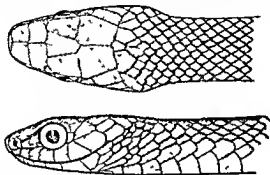


fig. 50 — *Zootis nigromarginatus* (B.M. 1914.3.2.12)

merged to blue green, then pale greenish, and, finally, yellow in the length of the snake. Some grey speckling was seen beneath the tail."

According to him also (1907) "the secretion of the anal glands was blackish, an unusual colour I have seen only in the Kraits (*Bungarus*)."

Genus COLUBER.

RACERS

- Coluber* Latr. 1758, Syst. Nat., Ed. 10, p. 216, in part (type constrictor). Stejneger & Barbour Check List N. Amer. Amphib. & Rept. 1917, p. 78. Ortenburger, Mem. Univ. Michigan Mus. 1, 1928, p. 1. Werner, Zool. Jahrb. lvi, 1929, p. 63 (in part). Pope, Rept. China, 1913, p. 223.
Zamenis Wagler, 1830, Nat. Syst. Amphib. p. 188 (type *ammonensis*). Boulenger, F. B. I. 1890, p. 323 and P. Z. S. 1891, p. 632, and Cat. Sn. Brit. Mus. i, 1893, p. 379; Wall, J. Bombay N. H. S. xlix, 1923, p. 618.

- Platyceps* Blyth, 1860, J. A. S. Bengal, xxix, p. 114 (type *semifasciatus*).
Megablades Günthor, 1865, Ann. Mag. Nat. Hist. (3) xv, p. 92 (type *olivaceus* = *dipsas*).
Spalerosophis Jan, 1865, in De Fillipi, Viagg. Persia, p. 356; Schmidt, Field Mus. Nat. Hist., Zool. xvii, 1930, p. 226 (type, by designation, *microlepis*), and *ibid.* xxiv, 1939, p. 77.
Argurogena Werner, 1924, Sitz. Ber. Akad. Wiss. Wien, cxxxiii, p. 51 (type *rostrata*).
Acanthocalyx Cope, 1895, Tr. Amer. Phil. Soc. xviii, p. 204 (type *ventrimaculatus*).

The above synonymy refers only to the Oriental species.

Maxillary teeth 13 to 18 (for the species included in this work), increasing in size posteriorly, the last two separated from the others by a more or less distinct interval (except sometimes in *diadema*). Head elongate, distinct from neck; eye large, with round pupil; one or more suboculars. Body elongate, cylindrical; scales in 19-33 rows at mid-body, reducing by 4-8 rows before the tail, with apical pits. Ventrals rounded or with a lateral keel; tail moderate or long, subcaudals paired.

Common characters, unless otherwise stated:—Snout projecting; a more or less distinct canthus rostralis; nostril between two nasals: loreal squarish or a little longer than broad: one large preocular, extending on to the upper surface of the head, usually touching the frontal; a presubocular below it; 2 postoculars: posterior genials longer and narrower than the anterior, the latter separated from one another by small scales.

Range. Europe; Africa north of the Equator; Asia.

Wall, J. Bombay N. H. S. xviii, 1908, p. 689, and xxix, 1923, p. 618, records a specimen of the African *C. florulentus* from Quetta, Baluchistan. The specimen cannot now be found.

Key to the Species.

- I. Scales in 19 rows.
 Two labials touch the eye; V. 199-211, [p. 168.
 C. 82-119 *ventromaculatus*,
 Two labials touch the eye; V. 205-244,
 C. 110-144 *rhodorhachis*, p. 168.
 One labial touches the eye, the 6th separated
 from it by a subocular *karelini*, p. 169.
- II. Scales in 21 or 23 rows.
 8 supralabials; C. 77-92 *fasciolatus*, p. 170.
 9 supralabials; C. 118-127, 1 preocular *gracilis*, p. 171.
 9 supralabials; C. 82-101, 2 preoculars *ravergieri*, p. 172.
- III. Scales in 25 or 33 rows; eye separated
 from the labials by a series of sub-
 oculars.
 Rostral not higher than broad, *diadema*, p. 173.
 Rostral much higher than broad, produced well
 on to the upper surface of the snout *arenarius*, p. 175.

102 *Coluber ventromaculatus*

Coluber ventromaculatus Gray & Hardwicke 1834 Ill Ind Zool ii pl 89 fig 1 (no type loc given, London).—*Zamenis ventromaculatus* Boulenger F B I 1890 p 325 and Cat Sn. Brit Mus i 1893 p 390. Nikol'sky Faune de la Russie 1916, p 3. Wall J Bombay N H N xxix 1914 p 34, col pl. and (in part) xx x 1923 p 618. Inghisby Ibid xxix 1923 p 124. *Coluber cheuensis* Mart n 1878 P Z S p 81 (Euphrates, London). *Liasiceps semifasciatus* Blyth 1891, J A S Bengal, xxix, p 114 (near Sumla). Blanford ibid xiv, 1875 p 208.

Maxillary teeth 14 or 15 diastema distinct, head very distinct from neck. Rostral as high as broad or a little higher, extending well on to the snout, separating the internasals anteriorly. Internasals a little shorter than the prefrontals, temporals 2+3. 9 supralabials, 5th and 6th touching the eye. 6th highest and in contact with the lower anterior temporal which is larger than the others. Scales in 19 19 15 or 13 rows smooth, V 199-211 angulate laterally, C 82-119. A 2 for specimens from India and Persia.

Hemipenis extending to the 10th caudal plate. The calyculate area occupies $\frac{1}{4}$ of the organ the cups being deeply scalloped and spinose. This area merges gradually into a spinose one the spines being more or less uniform in size, there are about 20 in lateral series.

Light greyish above with a dorsal series of black cross bars or rhomboidal spots the colour of which is confined chiefly to the edges of the scales. A series of smaller spots along the sides of the body formed in the same way, and usually alternating with the dorsal bars. Ventrals whitish or yellowish, a short black vertebral stripe on the neck, an oblique black bar below the eye and another on the temple, present or absent. Head greyish with or without dark symmetrical markings. Tail above uniform greyish. The width and intensity of blackness of the dorsal bars is variable, they may be narrower or broader than their interspaces.

Total length ♂ 1090 tail 275 ♀ 1000, tail 285 mm.

Range North western India through Afghanistan and Persia to Uzbekistan and west to Palestine. Recorded in India from Chitral in the north, eastwards to Almora district in the United Provinces and south to Kandesh in the Bombay Presidency.

103 *Coluber rhodorhachis*

Zamenis rhodorhachis Jan. 1865 in De Filippi Viaggi in Persia, p 256 (Persia). Boulenger P Z S 1891 p 632, and Cat Sn. Brit Mus i 1893 p 399. Alcock & Finn J A S Bengal lxxv, 1896 p 463. Nikol'sky Faune de la Russie 1916, p. 95; Wall, J Bombay N H N xviii, 1908 p 798 and xx, 1911, p 1034 and xxi 1911 p 134.

Zamenis ladacensis Anderson, 1871, J. A. S. Bengal, xl, p. 16 (Ladak; Calcutta); Boulenger, F. B. I. 1890, p. 326.

Gonyosoma dorsale Anderson, 1871, P. Z. S. p. 395, fig. (Shiraz, Persia; Calcutta).

Zamenis ventrimaculatus, Wall, J. Bombay N. H. S. xxix, 1923, p. 618 (in part).

Like *ventromaculatus* in head scalation. Scales in 19 : 19 : 13 or 11 rows : V. ♂ 205-229 (252) ; ♀ 218-244 : C. ♂ 110-144 ; ♀ 124-136 : A. 2 (for specimens from India and Persia). V. 252 occurs in a ♂ from Gilgit.

Hemipenis like that of *ventromaculatus*.

Two distinct colour forms can be defined ; intergradation between them is rare.

I. Like *ventromaculatus*, but the dorsal bars often interrupted on the vertebral line, so that series of short paired bars or spots result, or the spots may be arranged in a chessboard pattern ; the black vertebral stripe of the nape is replaced by one or two cross-bars ; sides of the head with regular spots or vertical bars, the area in front of and behind the eye always yellow ; the uniform colour of the tail extends on to the posterior part of the body.

II. Uniform greyish, the scales finely edged with dark green or black, and with a red or pink vertebral stripe which disappears on the hinder part of the body.

Length as in *ventromaculatus* but of more slender habit.

Range. Egypt, Arabia and Transcaspia to N.W. India. Form I, within Indian limits, is known from Baluchistan, Chitral and Gilgit. Form II inhabits Persia, Arabia and Baluchistan.

Wall has united this species with *ventromaculatus*, and Form I certainly resembles it very closely. The higher ventral count, however, the greater reduction of scale-rows on the posterior part of the body, and the slight differences in coloration, justify its retention as a distinct species.

104. *Coluber karelini*.

Coluber (Tyria) karelini Brandt, 1838, Bull. Acad. St. Petersb. iii, p. 243 (S.W. Asia).—*Zamenis karelini*, Boulenger, F. B. I. 1890, p. 326, and Cat. Sn. Brit. Mus. i, 1893, p. 401 ; Alcock & Finn, J. A. S. Bengal, lxx, 1896, p. 563 ; Nikolsky, Faune de la Russie, 1916, p. 98 ; Wall, J. Bombay N. H. S. xx, 1911, p. 1035, and xxix, 1923, p. 618.

Maxillary teeth 13 to 15, diastema distinct ; head very distinct from neck ; snout pointed and strongly projecting ; rostral as broad as high, extending well on to the snout, separating the internasals anteriorly ; internasals usually longer than the prefrontals ; temporals 2+3 ; 9 supralabials, 5th touching the eye, 6th prevented by a subocular. Body more slender than in the two preceding species ; scales in

19 19 13 rows, smooth V 193-212, angulate laterally, C
85-110 A 2

Hemipenis the calyculate area occupies one third of the organ the cups are very large, much longer than broad, and deeply scalloped with spinose edges, the spines are of uniform size about 20 in lateral series

There are two colour forms

I Light greyish above with narrow black cross bars which are broadest on the fore part of the body and always narrower than their interspaces sides of the body with vertical spots, which alternate with the cross bars and extend on to the outer margins of the ventrals a black bar below the eye and an oblique one on the temple, lower parts whitish or yellowish

II Pale greyish above with (in life) a bright orange vertebral stripe the interstitial skin on the anterior part of the body is black and this may include the margins of some of the scales on the neck

Total length ♂ 835, tail 225, ♀ 940, tail 230 mm

Range Transcaspia Turkestan, Persia, Afghanistan, Baluchistan

A South west Asian species that just reaches India on the Afghan Baluchistan border Both colour forms are known from that area

105 *Coluber fasciolatus*

BANDED RACER.

Russell Ind Herp i 1794 p 26, pl xx (India)

Coluber fasciolatus Shaw, 1802 Gen. Zool iii, p 528 (based on Russell's plate) — *Zaenenia fasciolatus* Gunther Rept Brit Ind.

1864 p 254 pl xxi fig 2 Boulenger P B I 1890 p 327,

and Cat Sn Brit Mus i 1893 p 404, Wall J Bombay

N II 8 xviii, 1907 p 113 and xxii 1914 p 34 col pl.

and xxix, 1927 p 619 and Sn. Ceylon, 1921, p 191; Prater,

i Bombay N II 5 xxx 1929 p 169 Nichols Spol Zeyl.

xv 1909 p 91 and xvii 1912 p 39, Fraser, J Bombay

N II 8 xxxix, 1937, p 476

Coluber kobe Daudin, 1803, Hist Nat Rept vi, p 383 (based on Russell's plate)

Coluber curvirostris Cantor 1839 F Z 8 p 51 (ool sketch in Bodleian Library; Bengal)

Axyropea rostrata Werner 1924 Sitz. Ber Akad. Wiss Wien,

cxviii, p 51 ("Argentine" Vienna), Smith, Ann. Mag. Nat.

Hist (10) i 1928 p 425

Maxillary teeth 12 to 14, diastema distinct; snout strongly projecting, head feebly distinct from neck, rostral large, much broader than high, suture between the internasals about as long as that between the prefrontals, presubocular sometimes absent temporals 2+3 or 3+3, 8 supralabials, 4th and 5th touching the eye, 5th highest and touching the lower anterior temporal Scales smooth, in 21 or 23 21 or

23 : 17 or 15 rows. V. 197 to 225, obtusely angulate laterally ; C. 77-92 : A. 2.

Hemipenis : the distal one-third of the organ has closely packed, deep-walled calyces ; these have finely denticulate edges, but no spines ; there are three prominent folds, one of which contains the sulcus ; the distal area, both on the folds and between them, is covered with irregularly shaped, closely set papillae ; there are no large spines as in the other species mentioned in this work, but many of the papillae have minute spicules projecting from their tips.

The young are light or dark olive-brown above, beautifully ornamented with narrow cross-bars on the anterior half of the body ; these are formed by a pattern of white, and dark brown or black, the colours being more or less equally distributed upon the scales : posterior part of body with indistinct dark cross-bars or spots, these markings gradually disappearing towards the tail, which is uniform brown in colour ; head above marbled with light and dark olive, and two white spots, one on each side of the interparietal suture. With age the markings tend to disappear, and old individuals are usually uniform brown in colour ; lower parts whitish or yellowish.

Total length : ♂ 1015, tail 250 ; ♀ 1000, tail 210 mm.

Wall records an individual 4 ft. 2½ in. (1260 mm.) in length.

Range. Peninsular India, extending in the north-west as far as a line drawn from Baroda through Gwalior to the Himalayas south of Nepal ; in the east to Western Bengal ; northern Ceylon.

According to Wall it is fairly common in Mysore, and is quite a common snake in Konkan, Bombay district. In other parts of its wide range it appears to be rare.

A plucky and vicious snake : when molested it erects itself, and flattens the body behind the neck like a cobra, for which snake it is sometimes mistaken (Wall).

106. *Coluber gracilis*.

Zamenis gracilis Günther, 1862, Ann. Mag. Nat. Hist. (3) ix, p. 125, and Rept. Brit. Ind. 1864, p. 254, pl. xxi, fig. H (Sind ; London) ; Boulenger, F. B. I. 1890, p. 327, and Cat. Sn. Brit. Mus. i, 1893, p. 404 ; Wall, J. Bombay N. H. S. xxix, 1923, p. 618.

Maxillary teeth 13 or 14, diastema distinct ; head very distinct from neck ; rostral as broad as high, not separating the internasals, which are nearly as long as the prefrontals ; temporals 2+2 ; 9 supralabials, 5th and 6th touching the eye, 6th highest and in contact with the anterior lower temporal. Scales in 21 : 21 : 15 rows, smooth. V. 206-222 ; C. 118-127 ; A. 2.

Hemipenis not known.

Light greyish brown above, with narrow white, black edged cross bars which expand on the outer sides of the body and connect more or less completely with those in front and behind, thus enclosing circular or oval spots, these markings become less distinct on the hinder part of the body and tail where they are replaced by short, narrow, black cross bars or spots head above with white, black-edged markings, namely, a bar across the snout in front of the eye, and two A shaped marks behind one on the vertex, the other on the nape; lower parts whitish or yellowish, the outer margins of the ventrals with black spots

Total length ♀ 930, tail 270 mm

Range India Neighbourhood of Bombay, Central Provinces (Aurangabad) *fid* Wall

A rare snake known only from a few specimens Günther's illustration of this very beautiful species is excellent

107 *Coluber ravergieri*

Coluber ravergieri Menéndez 1832, Cat Rais Obj Zool p 62 (Baku, Leningrad) — *Zamenis ravergieri* Boulenger Cat Sn. Brit Mus i, 1893 p 405, Wall, J Bombay N H 8 xx, 1911, p 1075, and xxii, 1911 p 137, and xxix, 1923 p 619, Nikol'sky, Faune de la Russie 1916 p 102

Maxillary teeth 14 or 15, diastema distinct; rostral broader than high, scarcely visible from above, internasals about as long as the prefrontals, 2 preoculars, temporals 2+3 or 3+3, 9 supralabials 5th and 6th touching the eye, 6th highest and in contact with the lower anterior temporal Scales in 21 21 15 rows, smooth or obtusely keeled on the posterior part of the body V 197-234, C 82-101, A 2

Hemipenis the distal end has two longitudinal, thick, sponge like folds, lying on each side of the sulcus, the area upon one side being smooth, on the other calyculate The spines are relatively short and stout, there are from 15 to 20 in lateral series

Pale buff or greyish above, with a dorsal series of dark rhomboidal spots or narrow cross bars, alternating with a series of smaller spots on each side, on the tail the spots are usually confluent, and form three conspicuous longitudinal streaks, an oblique dark streak below the eye, and another one from the eye to the angle of the mouth, head with symmetrical dark spots or nearly entirely black, belly uniform whitish, or more or less obscured with blackish dots

Total length ♂ 1160, tail 285, ♀ 1000, tail 215 mm

Range From Transcaspius and Transcaucasia to Baluchistan and the NW F Provinces Wall (1911) collected 7 examples in Chitral at altitudes varying from 9,000 to 11,000 ft One was picked up in a snow drift apparently dead, but revived in the warmth of the hand

108. *Coluber diadema*.

DIADEM SNAKE.

Russell, 1801, Ind. Serp. ii, p. 34, pl. xxx.

Coluber diadema Schlegel, 1837, Phys. Serp. ii, p. 148 (based on Russell's plate).—*Zamenis diadema*, Günther, Rept. Brit. Ind. 1864, p. 252, pl. xxi, fig. G; Boulenger, F. B. I. 1890, p. 326, and Cat. Sn. Brit. Mus. i, 1893, p. 411; Wall, J. Bombay N. H. S. xx, 1911, p. 1035, and xxi, 1911, p. 138, and xxiii, 1914, p. 210, col.-pl., and xxix, 1923, p. 619; Nikolsky, Faune de la Russie, 1916, p. 107; Ingoldby, J. Bombay N. H. S. xxix, 1923, p. 129.—*Spalerosophis diadema*, Schmidt, Field Mus. Nat. Hist., Zool. xvii, 1930, p. 226 and xxiv, 1939, p. 77.

Zamenis diadema var. *atriceps* Fischer, 1885, Jahrb. Hamburg Wiss. Anst. ii, p. 102 (Himalayas).

Zamenis diadema melanoides Wall, 1911, J. Bombay N. H. S. xxiii, p. 211 (Jodpur, Rajputana and Baluchistan).

Maxillary teeth 16–18, diastema absent or very slight; head very distinct from neck; rostral not higher than broad;

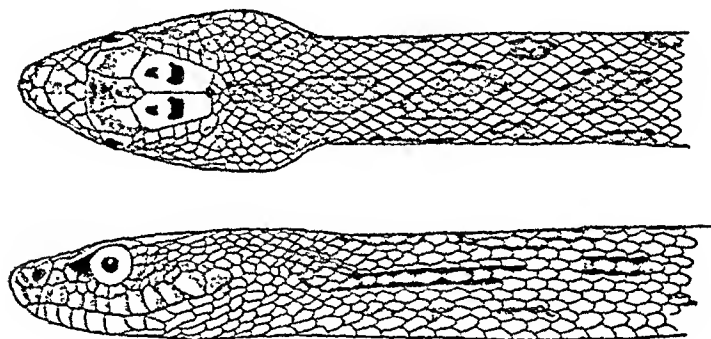


Fig. 51.—*Coluber diadema diadema*. (B.M. 1901.1.30.10.)

prefrontals broken up into several shields, the median ones forming an angle with the hinder margins of the internasals; 2 loreals, one behind the other; 2 preoculars and a series of suboculars separating the labials from the eye; 3 or 4 postoculars; temporals small, scale-like, 3 or 4 anterior; 10–13 supralabials; posterior genials usually shorter than the anterior. Scales more or less obtusely keeled, in 29 or 31, rarely 27 or 33 rows at mid-body, 2 or 4 less on the neck, 21 or 19 posteriorly. V. 216–250 (278); C. 82–112; A. 2; for specimens from India, Baluchistan and Afghanistan. V. 278 occurs in a ♀ from Gilgit.

Hemipenis: the distal half is calyculate, the calyces being large, much longer than broad and with denticulate edges; opposite the sulcus there are a few enormous cups, the area covered by the largest being from 6 to 10 times greater than that occupied by the cups in other parts; these large cups are

separate from the silent by a short thick spongy fold. The spinose area is short the spines being coarse and longest distally and becoming shorter as they approach the base of the organ there are about 20 in lateral series.

Two very distinct colour forms can be defined.

I *Coluber diadema diadema* Light brownish or greyish above with a dorsal series of large dark rounded or rhomboidal spots alternating with a much smaller series on each side of the body head with a regular pattern of darker markings often broken up the most constant being a dark bar between the eyes an oblique stripe from behind the eye to the angle of the mouth and a () shaped mark on the parietals these markings are very distinct in the young but become

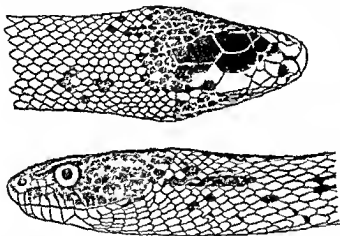


Fig. 52.—*Coluber diadema atriceps*

less distinct as age advances, lower parts whitish sometimes with indistinct dark spots at the outer margins of the ventrals.

II *Coluber diadema atriceps* Light yellowish brown paler below than above with irregularly scattered dark brown or black spots these may be confined to individual scales or may be much more thickly distributed forming large rhomboidal dorsal spots similar in position to the dorsal spots of *forma typica*. Head partly or entirely black. According to Wall, the dark markings of this form are in life claret coloured or scarlet. Belly uniform rose-pink in life with a lateral mottling of dark spots.

It is possible that these two forms represent distinct species.

In the arrangement of the dorsal markings, *atriceps* may resemble the typical form, but I have not seen any specimens of the typical form showing the head pattern of *atriceps*. The typical form also is more slender in body. The juvenile of the typical form is well known, that of *atriceps* has not yet been met with.

Total length: ♂ 1200. tail 220; ♀ 1550, tail 325 mm. (*atriceps*). Wall records an individual 6 ft. 7 in. (1975 mm.) in length.

Range. *C. d. atriceps* appears to be confined to India. I have examined specimens from Gilgit, Agra, Jeypore, Allahabad, Delhi and Harrand.

Forma typica has in India the same distribution as *atriceps*, but extends its range through Baluchistan, Afghanistan, Southern Turkestan and Persia to Northern Africa.

Wall found this snake common in Chitral at altitudes of 4,000 and 5,000 ft. His coloured plate showing both forms, is excellent.

Schmidt (1939) splits *diadema* as here conceived into at least three species, restricting *diadema* proper to N. W. India. He places them in the genus *Spalerosophis*, which, he says, is more allied to *Elaphe* than to *Coluber*.

109. *Coluber arenarius*.

Zamenis arenarius Boulenger, 1890, F. B. I. p. 329 (Karachi and Sind; London). and Cat. Sn. Brit. Mus. i, 1893, p. 413, pl. xxviii, fig. 2; Wall, J. Bombay N. H. S. xxix, 1923, p. 619.—*Spalerosophis arenarius*, Schmidt, Field Mus. Nat. Hist., Zool. xvii, 1930, p. 226.

Maxillary teeth 14, diastema very small: head very distinct from neck; rostral much higher than broad, extending well on to the upper surface of the snout, separating the internasals for half, or more than half, their length; prefrontals broken up into 3 or 4 shields arranged in a transverse series, the median forming an angle with the hinder margins of the internasals; 2 loreals, one behind the other: 2 preoculars, and a series of suboculars, separating the labials from the eye; 3 postoculars; temporals small and scale-like, 3 anterior; 10 supralabials; posterior genials longer or shorter than the anterior. Scales in 25: 25 or 27: 17 rows, obtusely but distinctly keeled, strongly on the posterior part of the body. V. 227, not angulate laterally; C. 80; A. 1.

Hemipenis: much like that of *diadema* (specimen in poor condition).

Cream-colour or pale buff above, with darker spots disposed quincuncially, and a longitudinal streak on each side of the nape; lower parts whitish.

Total length: ♂ 930; tail 175 mm.

Range N.W. India Karachi Sind, Rajputana Known from three specimens, the types, two in number, consist of the head and anterior part of the body, the third, in the Indian Museum is complete

Genus XENELAPHIS

Xenelaphis Gunther 1864 Rept Brit Ind p 250 (type *Aezagonotus**) Boulenger, F B I 1890 p 336 and Cat Sn Brit Mus n 1894 p 7 and Rept Malay Icn 1912, p 139

Maxillary teeth 25 to 30, gradually increasing in size posteriorly compressed head distinct from neck, eye moderately large with round pupil nostril between two nasals; a pre and a postsubocular, body elongate, cylindrical, rather stout, scales smooth in 17 rows, without apical pits, the vertebral row slightly enlarged and hexagonal, ventrals rounded, tail long subcaudals paired Hypapophyses absent on the posterior dorsal vertebrae

A single species

110 *Xenelaphis hexagonotus*.

Coluber hexagonotus Cantor, 1847, Cat Malay Rept p 74 (and errata Great Hill, Pinang) — *Xenelaphis hexagonotus* Gunther, Rept Brit Ind 1864 p 251, pl. xxi fig C, Theobald, J Linn. Soc. z 1868 p 46 Girani, Rept Cochinchine et Cambodge, 1883 p 417, Boulenger, F B I 1890 p 336, and Cat Sn Brit Mus n 1894 p 8, and Rept Malay Pen. 1912, p 139, Wall J Bombay N II 8 xxix, 1923 p 620; Bourret, Serp Indo-Chine, 1936 p 183 — *Ptyas hexagonotus* Theobald Cat Rept Brit Ind 1876 p 163
Coryphodon subulacrus Dum. & Bib, Erp Gen 1834 vii p 187 (Java)

Internasals as long as, or a little longer than, the prefrontals, loreal about as long as the eye, 1 large preocular, 2 postoculars, temporals 2+2, normally 8 supralabials, the 4th touching the eye, the 3rd and 5th excluded by a small presubocular and a large postsubocular, a 3rd subocular sometimes present, separating the eye from the labials, gonials elongate, anterior pair longest Scales in 17 17 15 or 13 rows V 185-193, C 140-179, A 2

Hemipenis extending to the 10th caudal plate, not forked; the distal half is calyculate, the cups being large, thick walled and feebly scalloped, the posterior half has large, fleshy spines, 4 or 5 in lateral series, at the extreme tip of the organ there are two smooth pockets; extending the whole length of the calyculate area are two folds, they are provided with short, stout spines, the larger of the two encloses the sulcus

The young are pale brownish in colour, with strongly marked black cross bars, which are indistinct on the posterior part of the body and absent on the tail, these markings

* *Aezagonotus* as originally spelt is a clerical error

disappear with age and adult individuals are dark olive above, the cross-bars showing as indistinct marks on the sides of the body; lower parts uniform yellowish.

Total length: ♂ 1380, tail 480 mm.

Range. The Malayan Region; Southern Indo-China.

Theobald (1868) records a specimen caught in Rangoon, and Tirant (1885) 2 specimens captured in the gardens of Cholon, near Saigon. It has not been obtained in Indo-China since, and none of the specimens are available for examination now.

Genus OPHEODRYS.

Opheodrys Fitzinger, 1843, Syst. Rept. p. 26 (type *æstivus*); Schmidt, Herpetologica, Chicago, i, 1936, p. 63.

Cyclophis Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 119, and Rept. Brit. Ind. 1864, p. 229; Schmidt, Herpetologica, Chicago, i, 1936, p. 64 (type *æstivus*).

Euryphasia (not of Pictet, 1850) Hallowell, 1860, Proc. Acad. Nat. Sci. Philad. xii, p. 403 (type *semicarinatus*); Pope, Rept. China, 1935, p. 281.

Cyclophaps Boulenger, 1888, Ann. Mus. Civ. Genova, (2) vi, p. 599 (type *dorise*).

Entechinus Cope, 1895, Pr. Acad. Nat. Sci. Philad. xlv, p. 427 (type *Cyclophis major*).

Maxillary teeth 18 to 33, equal, or 1 or 2 of the most anterior and posterior smaller than the others; head distinct from neck; eye large with round pupil. Body elongate, cylindrical. Scales in 15 rows throughout, smooth or keeled, without apical pits; ventrals rounded; tail long, subcaudals paired.

Common characters, unless otherwise stated:—Nostril between two nasals; internasals much smaller than the prefrontals; loreal small, longer than high; 1 pre-, and 2 or 3 postoculars; temporals 1+2; 8, rarely only 7, supralabials, 4th and 5th touching the eye.

Range. The Indo-Chinese subregion; China; Formosa; the Riu Kiu Islands; North America.

The genus includes eight species; four are included in the present work; two more inhabit Formosa and the Riu Kiu Islands; the remainder North America. The predominant colour of all the species is green.

Key to the Species.

- I. Less than 188 ventrals.
 - Internasals truncate anteriorly; anal divided; uniform green above *major*, p. 178.
 - Internasals distinctly narrowed anteriorly; anal divided; green above anteriorly, greyer posteriorly, with or without light cross-bars posteriorly *multicincta*, p. 179.
 - Snout strongly convex in profile, anal entire; uniform green above *dorise*, p. 181.
- II. Ventrals 194.
 - Anal entire, uniform green above *hamptoni*, p. 180.

111 *Ophiodrys major*

Cyclophis major Günther 1858 Cat Col Sn. Brit Mus p 140
 (Ningpo China London) Boulenger Cat Sn. Brit Mus 12,
 1894 p 279 — *Eurypholis major* Pope Rept China, 1935 p 283
 figs Bourret Serp Indo-Chine 1935 p 259
Herpetodryas chloris Hallowell 1840 Pr Acad. Nat Sc Philad.
 xii, p 503 (Hong Kong)
Coluber delacour Smith 1930 Ann. Mag Nat Hist (10) vi,
 p 681 (Fan-s pan Mountains Tong King; London)

Maxillary teeth 20-23 1 or 2 of the most anterior and posterior smaller than the others (fig 48 p 159) diameter of the eye less than its distance from the nostril internasals truncate anteriorly nostrils lateral genuals variable the anterior pair longer or shorter than the posterior Scales in 15 15 15 rows smooth or some of the mid-dorsal rows posteriorly more or less distinctly keeled V 154-178 C 70-92 A 2

Hem penis extending to the 14th caudal plate not forked the distal $\frac{1}{2}$ is calyculate the cups being large deep thick



Fig 53 — *Ophiodrys major* (B.M 1930 11 166)

walled and of almost uniform size throughout the edges are scalloped and have small sparsely scattered spines this area passes abruptly into a spinose one the spines being large and few in number

Uniform green above whitish or pale greenish below the colour descending on to the outer margins of the ventral shields A juvenile from China in the British Museum collection has a vertebral series of black blotches on the anterior part of the body

Total length ♂ 1200 tail 270 (Tong King) ♀ 795 tail 185 mm (Ning po China)

Pope's measurements of a good series of specimens from China show that the species is consistently smaller there than it is in Tong King he also points out that the males are larger than the females

Variation Fragmentation of the upper anterior portion of the anterior temporal may occur giving the impression of two anterior shields

Range. China; Hong Kong; Tong-King (Fan-si-pan Mountains).

Found in the hills at varying altitudes

Pope, writing of the snake in China, states "near Yenping I daily met it gliding about on the forest floor. It is apparently diurnal. It neither bites, strikes, nor assumes a defensive pose when annoyed." It feeds upon earthworms and caterpillars. From 4 to 13 eggs are laid at a time.

112. *Opheodrys multicinctus*.

Ablabes multicinctus Roux, 1907, Zool. Anz. xxxi, p. 762 (Tong-King; Basel).—*Liopeltis multicinctus*, Angel & Bourret, Bull. Soc. Zool. France, lviii, 1933, p. 135.—*Liopeltis major multicinctus*, Bourret, Serp. Indo-Chine, 1936, p. 262.—*Eurypholis multicinctus*, Pope, Rept. China, 1936, p. 285.

Ablabes retrofasciatus Angel, 1920, Bull. Mus. Hist. Nat. Paris, xxvi, p. 293, fig. (Laos; Paris).

Zamenis moi Smith, 1921, P. Z. S. p. 425 (Dran, S. Annam; London); Parker, Ann. Mag. Nat. Hist. 1925 (9) xv, p. 303.

Ablabes multicinctus bicolor Angel, 1929, Bull. Mus. Hist. Nat. Paris (2) i, p. 79 (Chiang-Kouang, Haut Laos; Paris).—*Liopeltis major bicolor*, Bourret, Serp. Indo-Chine, 1936, p. 262.

Maxillary teeth 18–20, one or two of the most anterior and posterior smaller than the others; diameter of the eye less than its distance from the nostril; snout distinctly convex, in profile with indistinct canthus rostralis; internasals narrowed anteriorly, the snout more pointed than in *major*; genials as in *major*. Scales in 15:15:15 rows, smooth. V. 164–177; C. 72–103; A. 2.

Hemipenis extending to the 14th caudal plate, not forked; the distal half is calyculate and passes abruptly into the spinose area; near the spines, which are relatively large and few, the calyces are thick-walled and edged with numerous short, soft papillae; distal to this they are smaller and are packed so closely together that only the papillae are visible on the surface. Parallel to the sulcus on its outer side and extending the whole length of the calyculate area is a broad and prominent fold, deeply recessed on each side (fig. 54B); another shorter and narrower fold lies outside it; these folds are formed by invaginations of the wall of the organ, which show as obliquely placed slits on the outer side; on each side of the sulcus and near the tip the calyculate area is replaced by one with oblique folds; these converge towards one another and terminate at the sulcus in a A-shaped point.

Green above anteriorly, becoming greyer posteriorly, the colour extending on to the outer margins of the ventral scales; on the posterior half of the body and tail there are numerous narrow, whitish, black-edged cross-bars, which may be complete or alternate with those of the opposite side; in some

individuals they are very indistinct and they may be entirely absent, the black edging is not consistent and the pattern is usually formed by one half of a scale being dark, the other light, belly whitish, more or less thickly powdered with green or grey, or entirely grey posteriorly

Total length ♂ 1070, tail 315, ♀ 905, tail 265 mm

Range Annam (Langbian plateau; Col des Nuages, Tourane), Haut Laos (Tran-ninh plateau), Tong-King (Chapa, Sim das, Thai nua), China (Kwang-si Province)

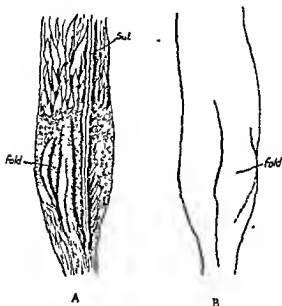


Fig 54.—Hamipnus of *Ophiodrys multicinctus* (B.M. 1921 4.131)
A. Internal structure B Dorsal view of external covering, showing fold.

113 *Ophiodrys hamptoni*.

Ablabes hamptoni Boulenger, 1900, Ann. Mag. Nat. Hist. (7) vi, p. 409 (Mogoke, Burma, London) — *Leopeltis hamptoni*, Wall, J. Bombay N. H. S. xxix, 1924, p. 855

Maxillary teeth 25, small, equal, eye large, its diameter greater than its distance from the nostril; snout pointed, convex in profile, internasals truncate anteriorly; nostrils lateral, a presubocular, anterior genials twice as long as the posterior. Body elongate. Scales in 15 15; 15 rows, smooth. V. 194, C 76, A 1

Uniform green above, the colour descending on to the outer margins of the ventral scales; upper lips and lower parts whitish.

Total length: 1070, tail 220 mm.

Known only from the type, which is a female.

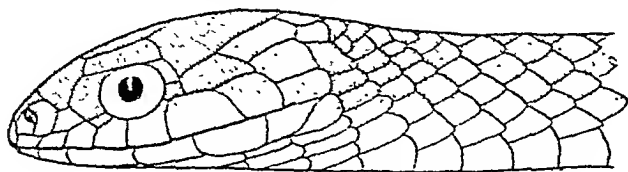


Fig. 55.—*Ophedrys hamptoni*. (B.M. 1900.9.20.15.)

114. *Ophedrys doriae*.

Cyclophiops doriae Boulenger, 1888, Ann. Mus. Civ. Genova, (2) vi, p. 599, pl. vi (Kachin Hills, Burma; London and Genoa).—*Ablabes doriae*, Boulenger, F. B. I. 1890, p. 306, and Cat. Sn. Brit. Mus. ii, 1894, p. 279.—*Liopeltis doriae*, Wall, J. Bombay N. H. S. xxix, 1924, p. 864, and xxx, 1925, p. 806.—*Eurypholis doriae*, Pope, Rept. China, 1935, p. 281, pl. xi.

Maxillary teeth 30–33, small, equal; eye large, its diameter greater than its distance from the nostril; snout shorter and more convex than in *hamptoni*; internasals truncate anteriorly; nostrils directed outwards and slightly upwards; anterior genials twice as long as the posterior. Scales in 15:15:15 rows, smooth. V. 168–187; C. 74–80; A. 1.

Hemipenis as in *major*, but the calyculate area less extensive and the cups at the extreme tip packed more closely together.

Uniform green above; upper lip and lower parts whitish.

Total length: ♂ 795, tail 185 mm. The type in London, which cannot now be found, measured 910 mm. in total length, tail 210 mm.

Range. Assam (Manipur); Upper Burma (Kachin Hills); S.E. Yunnan. Only three specimens are known.

Genus LIOPELTIS.

Liopeltis Fitzinger, 1843, Syst. Rept. p. 26 (type *Herpetodryas tricolor* Schlegel); Stejneger, Herpet. Japan, 1907, p. 337; Wall, J. Bombay N. H. S. xxix, 1924, p. 864.

Gongylosoma Fitzinger, l. c. s. p. 25 (type *Coronella baliodeira* Schlegel); Stejneger, Nyt. Mag. Naturw. Christians, lx, 1922 (2) p. 78.

Ablabes Dumeril, 1853, Mem. Acad. Sci. Paris, xxiii, p. 454, and Dum. & Bib., Erp. Gen. vii, 1854, p. 304; Boulenger, F. B. I. 1890, p. 304, and Cat. Sn. Brit. Mus. ii, 1894, p. 278 (type *Coronella baliodeira* by designation 1890).

Phragmitophis Günther, 1862, Ann. Mag. Nat. Hist. (3) ix, p. 126 (type *Cyclophis tricolor*).

Maxillary teeth 17-28, equal; head distinct or not from neck, eye large with round pupil. Body cylindrical. Scales in 13-15 or 17 rows not reducing posteriorly (except in *stoliczkae*) smooth without apical pits; ventrals rounded, tall long subcaudals paired.

Common characters.—1 pre- and 1 or 2 postoculars, temporals 1+2.

Range The Oriental Region. Dwarfed snakes, the largest not exceeding 600 mm in total length. Nine species are known, the three not included in this work inhabit the Malayan subregion.

Key to the Species

- A Head distinct from neck, nostril in a long undivided nasal, head and (or) neck with longitudinal stripes, scales in 15 rows.

Loreal present, C 70-105

Loreal present, C 116-134

Loreal united with nasal C 53-78

frenatus, p 182

stoliczkae, p 184

colomaria, p 184

- B Head not, or scarcely distinct, from neck, nostril large between two nasals, a dark bar across the neck.

Scales in 17 rows

Scales in 15 rows

Scales in 13 rows

nacibarum, p 183

rappi, p 185

scripae, p 186

115 *Liopelepis frenatus*

Cyclophis frenatus Günther, 1858 Cat. Col. Sn. Brit. Mus. p. 130 (Afghanistan, London), and Rept. Brit. Ind. 1864 p. 230 pl. 19 fig. 1.—*Allophis frenatus* Boulenger, F. R. S. 1890, p. 300, and Cat. Sn. Brit. Mus. 1894, p. 280. Annandale, Rec. Ind. Mus. viii, 1912, p. 47. Angel, Bull. Mus. H. N. Paris (2), 1929, p. 79.—*Liopelepis frenatus* Wall. J. Bombay N. H. 8 xxix, 1923-1924, pp. 467 and 464 and xxx, 1925, p. 214 and xxxi, 1926, p. 565. Smith, Rec. Ind. Mus. xli, 1940 p. 451.

Maxillary teeth 19-21, head not depressed, distinct from neck, snout not projecting, nostril rather large, in a long undivided nasal, sometimes a suture from it to the internasal, loreal squarish or a little longer than high, 7 supralabials, 3rd and 4th touching the eye, anterior genials a little shorter than the posterior. Scales in 15-16 rows. V 140-172, C 70-105, A 2.

Hemipenis extending to the 10th caudal plate, the distal half is calyculate, the cups being deeply scalloped and of almost uniform size, with spinose edges, the proximal half is spinose, the spines being relatively large and few in number, parallel to the sulcus at the distal end, there is a short broad fold.

Olivaceous above, the scales edged with black and sometimes also with white, forming longitudinal lines on the anterior half of the body, a broad black stripe from behind

the eye, passing backwards on to the neck, where it runs parallel to its fellow of the opposite side ; upper lip and lower parts whitish.

Total length : ♂ 760, tail 235 ; ♀ 645, tail 195 mm.

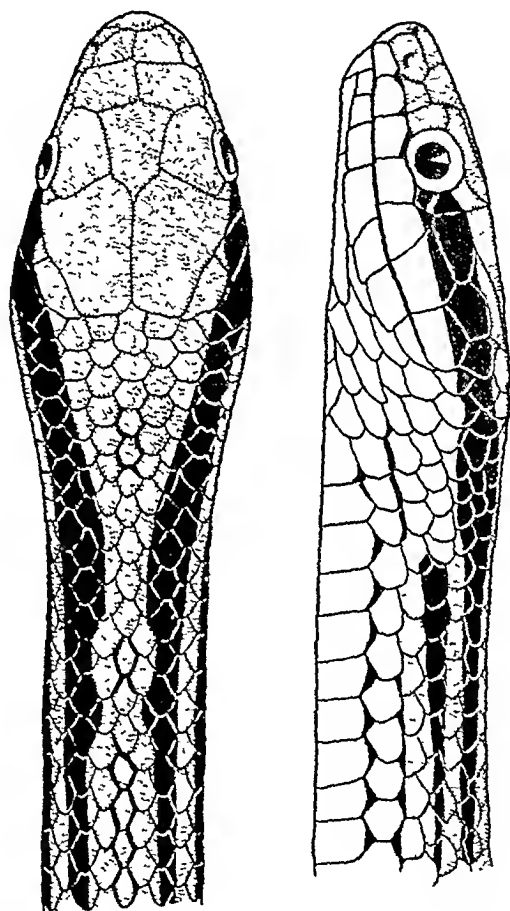


Fig. 56.—*Liopeltis frenatus*. $\times 2\frac{1}{2}$. (B.M. 1935.10.12.8-9.)

Range. Assam (Khasi, Kachin and Mishmi Hills) ; Burma (Bhamo district and the Triangle) ; Upper Laos (Chieng-Kuang, Tran-ninh plateau) ; Annam (Tourane).

Found in the hills at altitudes between 2,000 and 6,000 ft. Kaulback found it common at Htingnan, in the Triangle, Upper Burma.

116 *Liopeltis stoliczkae*

Ablabes stoliczkae Slater 1891 J A S Bengal, ix p. 234, pl. 8, fig. 1 (Naga Hills Assam Calcutta) Boulenger Ann. Mus. Civ. Genova (2) xli 1893 p. 233 and Cat. Sn. Brit. Mus. ii. 1894 p. 81 Wall J. Bombay N. H. S. xix 1909 p. 330, fig. head—*Liopeltis stoliczkae* Wall, ibid. xxix 1923 p. 364; Shaw & Shobhears J. Darjeeling N. H. S. iv 1929 p. 31 Shaw Shobhears & Barker J. Bengal N. H. S. xv 1940 p. 60.

Maxillary teeth 27 or 28 head distinct from neck much depressed snout projecting twice as long as the eye, nostril very small in a long undivided nasal loreal aquarish some times united with the posterior nasal 8 supralabials 4th and 5th touching the eye genuals subequal Scales in 15 15 13 rows V 148-154 C 116-134 A 2

Hemipen s not known.

Crevish above lighter below a broad black stripe on the side of the head extending and gradually disappearing on the fore part of the body a grey stripe on the outer margins of the ventrals and a less distinct and thinner median one present or absent

Total length ♂ 600 tail 225 ♀ 545 tail 205 mm

Range S. Kham Darjeeling district Assam (Naga Hills) Burma (Karin Hills)

A rare snake only 5 specimens being known

117 *Liopeltis calamaria*

Cyclophis calamaria Günther 1858 Cat. Col. Sn. Brit. Mus. p. 250 (Ceylon London)—*Ablabes calamaria*, Boulenger F. B. J. 189 p. 349, and Cat. Sn. Brit. Mus. ii. 1894, p. 83 Wall J. Bombay N. H. S. xxix 1923 p. 369—*Liopeltis calamaria* Wall, Sn. Ceylon, 1921 p. 231 fig., and J. Bombay N. H. S. xxx, 1924 p. 365

Hemalocoma bulatum Jan 1862, Arch. Zool. Anat., Phys. ii. p. 36 and Icon. Gen. ex. 1865 pl. 4 fig. 4 (type loc. unknown Milan not seen by me)

Cyclophis naxalis Günther 1864 Rept. Brit. Ind. p. 731 pl. 15 fig. 16 (type loc. unknown London)

Maxillary teeth 4-6 head not depressed fairly distinct from neck snout not projecting not twice as long as the eye nostril very small in a long undivided nasal which is united with the loreal normally 7 supralabials rarely only 6 3rd and 4th touching the eye anterior genuals a little longer than the posterior Scales in 15 15 15 rows V ♂ 126-142 ♀ 130-154 C ♂ 68-78 ♀ 53-72

According to Wall the variation in specimens from Ceylon is V 127-134 C 67-76

Hemipenis like that of *frenatus* in general construction, but the calices smaller more deeply scalloped and packed so closely together that only the papillae are visible on the

surface ; the spines are shorter, thicker and more numerous ; there is a fold.

Light brown, greyish-brown or greenish, above, the scales usually edged with black, showing as more or less distinct longitudinal lines, the most conspicuous being one on each side of the vertebral region ; they are separated from each other by five rows of scales. The area enclosed between them may be of a darker colour than that of the rest of the body ; lower parts whitish (yellow in life) ; a series of dark spots on each side of the head, the remnants of temporal stripes.

Total length : ♂ 335, tail 108 ; ♀ 390, tail 100 mm.

Range. Ceylon ; the Western Ghats as far North as Matheran ; Tinnevely Hills ; Mysore Plateau ; Bangalore ; United Provinces (Melaghat, Almora District, Kurkhana, Gonda District) ; Chota Nagpur (Surguja).

Found in the hills ; widely distributed but nowhere common.

118. *Liopeltis nicobariensis*.

Ablabes nicobariensis Stoliczka, 1870, J. A. S. Bengal, xxxix, p. 184, pl. xi, fig. 1 (Nancowry Haven, Camorta I., Nicobars ; Calcutta) ; Boulenger, F. B. I. 1890, p. 307, and Cat. Sn. Brit. Mus. ii, 1894, p. 285.—*Liopeltis nicobariensis*, Wall, J. Bombay N. H. S. xxix, 1924, p. 805.

Maxillary teeth 17-18 ; head not depressed, scarcely distinct from neck ; snout not projecting, twice as long as the eye ; nostril large, between two nasals, the posterior shield being much larger than the other and in contact with the preocular ; no loreal ; 7 supralabials, 3rd and 4th touching the eye, 7th very large ; temporals short, 2+2 ; genials subequal. Scales in 17 : 17 : 17 rows. V. 192 ; C. 84 ; A. 2. Hemipenis not known.

"Anterior half of the body reddish brown above, posterior blackish grey ; head above blackish, the first three labials with yellow spots ; a short broad yellow streak from behind and below the eye posteriorly to the angle of the mouth ; a black collar, margined on both sides with an interrupted yellow band, of which the anterior is the most distinct ; an indistinct series of blackish-grey dorsal spots, almost forming a dark undulating band ; sides marbled and freckled blackish grey, this colour being separated from the upper brown one by a series of closely set black spots, which are partially conspicuous on the posterior part of the body ; chin dusky ; lower parts yellow with a vermilion tinge ; each ventral with a large black spot near its outer extremity."

Total length : ♀ 440, tail 110 mm.

The description of the colour is Stoliczka's. The type and only known specimen is now somewhat faded but is otherwise in a fairly good state of preservation.

119 *Liopehtis rappi*

- Ablabes rappi* Günther 1860 P Z S p 154, pl. xxvi, fig B (Sikkim London Boulenger F B I 1890 p 307 and Cat Sn. B t Mus ii, 1894 p 282 Wall, J Bombay N H S xix, 1909 p 351—*Ablabes rappi* Shaw & Shebbeare J Darjeeling N H S 1909 p 31 Shaw Shebb & Barker J Bengal N H S xv 1940 p 62—*Liopehtis rappi* Wall, ibid xix, 1904 p 363
Ablabes ovum Günther 1860 P Z S p 155 pl. xxvi, fig A (Sikkim London)

Maxillary teeth 20-22 head somewhat depressed snout projecting twice as long as the eye nostril large between two nasals loreal a little longer than high 6 supralabials 3rd and 4th touching the eye 5th largest temporals 1+1 the anterior usually very long anterior genials longer than the posterior Scales in 15 15 15 rows V 178-193 C 60-76 A 2

Hemipenis extending to the 7th caudal plate the calyculate area occupies less than half the organ the cups are smallest at the tip and gradually increase in size towards the spinose area the spines are large and numerous and of almost uniform size except at the extreme base where there are two very large ones there is no fold

Brown above with small black spots and lateral transverse bars on the anterior quarter or third of the body a broad black light edged bar across the nape These markings may disappear entirely in the adult leaving the upper parts uniform dark brown in colour lower parts whitish (yellow in life)

Total length ♂ 455 tail 115 ♀ 440 tail 110 mm.

Range W Himalayas (Simala) E Himalayas (Nepal Darjeeling district)

The Simala specimen was obtained by Stoliczka and the locality given may be an error The species has not since been obtained in the W Himalayas fairly common in the Darjeeling District

120 *Liopehtis scriptus*

- Ablabes scriptus* Theobald, 1888 J Linn. Soc x, p 42 and Cat Rept As at Soc Mus 1888 p 49 (Martaban, Burma Calcutta) Boulenger F B I 1890 p 303 and Cat Sn. Brit Mus ii, 1894 p 284—*Liopehtis scriptus* Wall, J Bombay N H S xxix, 1924 p 864—*Gongylacoma scriptum*, Cochran, Proc US Nat Mus, lxxvii, (4) 1930 p 30; Smith, Bull Raffles Mus No 3 1930 p 56

Maxillary teeth 26-28 head somewhat depressed scarcely distinct from neck snout not projecting not twice as long as the eye nostril large between two nasals loreal very small 8 supralabials 3rd to 5th touching the eye 7th largest temporals 1+2 the anterior shield twice as long as the

posterior ; anterior genials shorter than the posterior. Scales in 13 : 13 : 13 rows. V. 126-145 ; C. 87-98 ; A. 2.

Hemipenis extending to the 7th caudal plate ; it is very different in structure to that of the other species. Extending the whole length of the organ are six more or less distinct longitudinal folds ; the area between them at the distal end is covered with flattish, irregularly shaped, papilla-like structures ; the folds themselves are composed of dense, sponge-like tissue through which project small spines : the two most conspicuous folds border the sulcus.

Light brown or greyish-brown above, the scales edged with black forming more or less distinct longitudinal lines and a series of small black spots on each side of the vertebral line ; these markings present only on the anterior part of the body ; a broad dark, light-edged bar across the nape : lips yellow

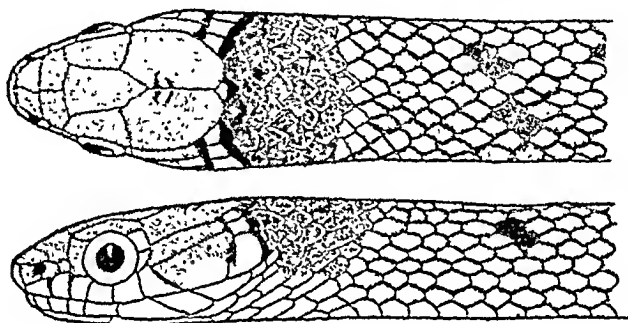


Fig. 57.—*Liopeltis scriptus*. (B.M. 1921.4.1.24.)

with black spots, the yellow ascending as a vertical bar in front of and behind the eye : lower parts whitish or yellowish.

Total length : ♂ 465, tail 155 ; ♀ 495, tail 175 mm.

Range. S. Burma (Martaban) ; Siam (Sai-Yoke, Kanburi district ; Khao Luang, Nakon Sritamarat Mountains ; Pulau Panjang, I. of Puket).

I know of six specimens.

Genus CONTIA.

Contia Baird & Girard, 1853, Cat. N. Amer. Rept. p. 110 (type *mitis=tenuis*) ; Boulenger, Cat. Sn. Brit. Mus. ii, 1894, p. 255 ; Nikolsky, Faune de la Russie, 1916, p. 162 ; Werner, Zool. Jahrb. Jena, lvii, 1920, p. 145 ; Wall, J. Bombay N. H. S. xxix, 1923, p. 769.

Eirenis Jan, 1863, Arch. Zool. Anat. Phys. ii, p. 256 (type *collaris*).

Pseudocyclophis Boettger, 1888, Zool. Anz. xi, p. 262 (type *walteri*) ; Boulenger, F. B. I. 1890, p. 299.

The above synonymy refers only to the Old World species.

Maxillary teeth 12-21 subequal Head depressed distinct or not from neck eye moderate or large with round pupil nasal usually entire loreal sometimes absent Body cylindrical scales smooth or keeled with apical pits in 15-19 rows ventrals rounded tail moderate or rather short subcaudals paired

Range South western Asia North Africa North America Ten or eleven species are known

Dwarfed degenerate snakes closely resembling the Oriental *Liopeltis* from which except for the presence of apical pits they are generically indistinguishable

Key to the Species

Scales in 15 rows on the neck C 63-84

persica, p 183

Scales in 13 rows on the neck; C 91-98

memaloni, p 189

121 *Contia persica*

- Cyclophis persicus* Anderson, 1874 F Z S p 292, fig 8 (Bombay Persia London) Blanford, Zool E Persia, 1878 p 408, pl xxvii fig 1—*Pseudocyclophis persicus* Boettger Zool Jahrb 1888 u. p. 9?—*Contia persica*, Boulenger Cat. Sn. Brit Mus ii 1893, p. 463; Wall, J Bombay N H S xxix, 1904 p. 891 and xxix 1903 pp. 632 and 769. In goldby bid. xxix, 1923 p. 179. Nikolay Faune de la Russie 1916 p. 177. *Contia angusticeps* Boulenger 1894 Cat. Sn. Brit Mus ii, p. 263 (Cherai Bahkhoran type lost) Annandale J A S Bengal, xxiii, 1904 p. 408. In goldby J Bombay N H S xxix, 1903 p. 179. Wall bid. xvi 1908 p. 501 fig. McLachlan, ibid. x 1902, p. 181. *Pseudocyclophis walleri* Boettger 1888 Zool Anz p. 464 (Neu Serachs N E Persia Boulenger J B I 1890 p. 200—*Contia walleri*, Boulenger Cat. Sn. Brit Mus ii, 1894 p. 263. Nikolay Faune de la Russie 1916 p. 173. Wall, J Bombay N H S xxix, 1903 p. 632.

Maxillary teeth 14 or 15 head not or scarcely distinct from neck nostril in a single elongated nasal internasals about as long as the prefrontals frontals about $\frac{1}{2}$ the length of the parietals loreal usually absent 7 supralabials 3rd and 4th touching the eye one pre and one postocular temporals 1+1 anterior genials much longer than the posterior Scales in 15 15 13 rows V 185-216 C 63-82 A 2

Hemipenis extending to the 13th caudal plate not forked there are spines throughout those at the extreme base being a little larger than the others Extending nearly the whole length of the organ there is a conspicuous fold.

Pale buff or greyish brown above uniform or with darker markings lighter below Head and nape with black cross-bars or entirely black above Young specimens may have the anterior half or two-thirds of the body above marked with narrow black cross-bars or with a reticulate pattern

Total length ♀ 480 tail 112 mm

Range. Sind ; Baluchistan ; N.W.F. Provinces (Waziristan, Parachinar and Malakand) ; Persia ; Transcaspia. Wall (1923, p. 770) records it from Murree, W. Himalayas.

122. *Contia memahoni*.

Contia memahoni Wall, 1911, J. Bombay N. H. S. xx, p. 1037 (Baluchistan ; Quetta), and xxix, 1923, p. 771.

Wall has described this species from 4 specimens which were in the Quetta Museum*. He states that it is nearest to *persica*, but differs in having more subcaudals (91-96), in having 13 scale rows anteriorly, and in coloration.

"The body dorsally is nearly uniform light brownish, the scales basally rather darker and the head is of a duskier shade in the adult. In the young the head is black, but not quite so black as in typical *persica* and *walteri*. Under-parts uniform whitish."

Genus LYTORHYNCHUS.

Lytorhynchus Peters, 1862, Mon. Acad. Berlin, p. 273 (type *diadema*) ; Boulenger, Ann. Mag. Nat. Hist. (5) xx, 1887, p. 414, and F. B. I. 1890, p. 322, and Cat. Sn. Brit. Mus. i, 1893, p. 414 ; Wall, J. Bombay N. H. S. xxix, 1923, p. 619 ; Werner, Zool. Jahrb. Jena, lvii, 1929, p. 62.

Chatachlein Jan, 1863, Arch. Zool. Anat. Phys. ii, p. 228 (type *diadema*).—*Catachilæna* Blanford, P. Z. S. 1881, p. 678 (emendation).

Acontiophis Günther, 1875, P. Z. S. p. 232 † (type *paradoxus*).

Maxillary teeth 6-9, the last two longer than the others, and separated from them by an interval. Head slightly distinct from neck, with cuneiform, projecting snout ; eye moderate or large, with vertically elliptic pupil ; rostral large, projecting, angularly bent in profile, concave inferiorly ; nostril an oblique slit between two large nasals. Body elongate, cylindrical ; scales smooth, or feebly keeled, without apical pits, in 19:19:17 or 15 rows ; ventrals obtusely angulate laterally ; tail moderate or short, subcaudals paired.

Range. From N.W. India through Baluchistan and Afghanistan to Northern Africa. Four species are known ; three inhabit India. Nothing appears to have been recorded of their habits.

Key to the Species.

- I. Rostral truncate anteriorly.
Prefrontal single or divided *ridgewayi*, p. 180.
- II. Rostral pointed anteriorly.
Rostral not anchor-shaped ; 5th labial touches the
eye *paradoxus*, p. 191.
- Rostral anchor-shaped when viewed from above ;
eye separated from the labials by suboculars. . . *maynardi*, p. 192.

* Lost when Quetta was destroyed by the earthquake in 1936.

† Also made by him as the type of a new family, the Acontiophidæ.

123 *Lytorhynchus ridgewayi*

- Lytorhynchus ridgewayi* Boulenger 1887, Ann. Mag. Nat. Hist. (5) xx p. 413 (Chink lok Afghanistan, London) and Tr. Linn. Soc. (2) v. 1889 p. 102 pl. xi fig. 1, and Cat. Sn. Brit. Mus. 1, 1893 p. 413. Alcock & Finn, J. A. S. Bengal lrv. (2) 1896, p. 526. Nikolsky Faune de la Russie, 1916 p. 111. Tzarewsky, Ann. Mus. Zool. Leningrad xxv 1917, p. 88. Wall, J. Bombay N. H. S. xx p. 1037 and xxx 1923, p. 619.
- Lytorhynchus ridgewayi* var. *rosens* Elpatjewski & Sabanejew, 1906 Zool. Jahrb. xxiv p. 257, pl. 19 figs. 6 & 7 (Nachdum, Transcaspija).
- Lytorhynchus gabrielis* Warner 1938, Zool. Anz. Leipzig cxxi (9-10) p. 268 figs. (Ziarat Baluchistan; not seen by me).

Rostral truncate anteriorly, as broad behind as in front, its posterior extremity separating the internasals for a short

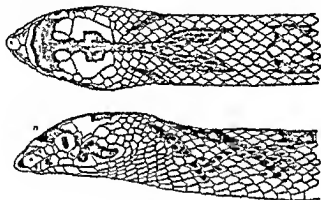


Fig. 58.—*Lytorhynchus ridgewayi* (B.M. 9.21.109.111)
n, Nostril

distance, a pair of prefrontals, or the two united forming a single large shield much larger than the combined internasals, frontal much expanded anteriorly, in good contact with the upper preocular, loreal usually single, 2 postoculars, 2 to 4 suboculars, these shields usually completely separating the eye from the labials, temporals irregular, 2 anterior, 7 or 8 supralabials 4th and 5th below the eye, or one of them touching it, anterior genuals larger than the posterior, the latter completely separated by small scales. Scales smooth V 174-188 C 41-54, A 1.

Hemipenis extending to the 10th caudal plate, not forked. The distal half is calyculate, the cups having spinose edges, this area merges gradually into a spinose one, the spines at the base being shorter than the others.

Pale buff or greyish above with a series of brown, black-

edged, squarish or transverse spots; sides less distinctly marked with smaller spots; an anchor-shaped marking on the head, the arms extending from one angle of the mouth to the other, passing through the eyes and crossing the frontal and prefrontal; the shank expands into a large spot on the middle of the parietals and bifurcates on the nape; lower parts uniform white.

Total length: 500, tail 80 mm.

Range. Baluchistan (Man, Gusht, Kacha, Sib, Kanki, Quetta); Afghanistan and Southern Turkestan to Transcaspia.

Werner's *gabrielis* appears to differ from *ridgewayi* only in having two prefrontals; there is a specimen in the British Museum from Persia also with a pair of prefrontals.

124. *Lytorhynchus paradoxus*.

Acontiophis paradoxa Günther, 1875, P. Z. S. p. 232, fig. (N. India; London); Murray, Ann. Mag. Nat. Hist. (5) xiv, 1884, p. 110.—*Lytorhynchus paradoxus*, Boulenger, F. B. I. 1890, p. 323, fig., and Cat. Sn. Brit. Mus. i, 1893, p. 416; Wall, J. Bombay N. H. S. xxix, 1923, p. 619.

Lytorhynchus monticornis Werner, 1926, Sitz. Ber. Akad. Wiss. Wien, cxxxv, 3, p. 243 (Sind; Vienna; not seen by me).

Rostral pointed anteriorly, rounded or angular posteriorly, separating the internasals for one-third of their length;

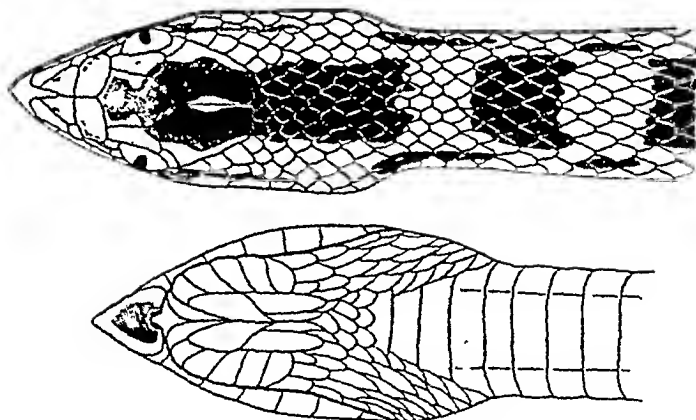


Fig. 59.—*Lytorhynchus maynardi*.

prefrontals larger than the internasals; frontal expanded anteriorly, in contact with, or just separated from, the preocular; a small lower preocular and a presubocular; loreal single; 2 postoculars; 8 supralabials, 5th touching the eye; mental produced anteriorly, fitting into a depression in the upper jaw; temporals 2+2 or 2+3; posterior genials as long

as the anterior, the latter separated by scales Scales smooth.
V 169-180, C 40-53, A 2

Hemipenis apparently like that of *ridgewaysi* (bad specimen)

Cream coloured above, with a dorsal series of squarish or butterfly shaped spots, and a less distinct lateral series of smaller spots on each side, a large rhomboidal brown spot on the back of the head and a brown streak behind the eye, lower parts white

Total length 370, tail 60 mm

Range Sind (Zangipur), W Punjab (Multan)

Four specimens are known

125 *Lytorhynchus maynardi*

Lytorhynchus maynardi Alcock & Finn, 1896, J. A. S. Bengal, lrv, p 562 pl 14 (S of Koh Malik-do Khand, Afghan Baluchistan Frontier Calcutta and London); Annandale J. A. S. Bengal, lxxix (5) 1904, p 208, Wall, J. Bombay N. H. S. xxix, 1923 p 619

Rostral pointed anteriorly, anchor shaped when viewed from above, the shank separating the internasals for half their length, prefrontals shorter than the internasals, frontal scarcely expanded anteriorly, not in contact with the preocular, 2 small preoculars, 3 postoculars and 2 suboculars, the latter completely separating the eye from the labials, a single loreal, temporals 2+2, 7 supralabials, 4th and 5th below the eye, mental produced anteriorly, fitting into a depression in the upper jaw, as in *paradoxus*, genials subequal, the posterior pair separated by scales Scales smooth
V 187-199, C 52-64, A 2

Hemipenis as in *ridgewaysi*

Cream coloured above and below, with a dorsal series of large oval or transversely placed spots of dark brown; a series of small paler spots on each side, alternating with the dorsal ones, a large elongated spot starting on the frontal, expanded on the parietals and extending on to the nape

Total length 400, tail 65 mm

Range Known from the type specimens, three in number
One had eaten a Lacertid

Genus RHYNCHOPHIS.

Rhynchophis Mocquard, 1897, Bull. Mus. Hist. Nat. Paris, iii, p 215 (type *boulengeri*); Pope, Rept. China, 1935, p 277, fig head, Bourret, Serp. Indo China, 1936, p 224, fig head

Maxillary teeth 19-21, the last 2 a little stouter than the others, head very distinct from neck, eye moderately large, with round pupil, snout terminating in a long pointed, flexible appendage, covered with small scales; nostril in the

nasal, or the shield partly divided. Body elongate, slightly compressed; scales in 19:19:15 rows, smooth, with apical pits; ventrals strongly angulate laterally, the shields feebly notched at the angle; tail moderate, the subcaudals paired and angulate like the ventrals.

A single species.

126. *Rhynchophis boulengeri*.

Rhynchophis boulengeri Mocquard, l. c. s. (Isles de Norway, Gulf of Tong-King: Paris); Pope, l. c. s.; Bourret, l. c. s., and Bull. Gen. Instr. Pub., Hanoi, Feb. 1939, p. 21.

Rostral distinct from the nasal appendage; internasals much smaller than the prefrontals; loreal longer than high; 1 large pre- and 2 or 3 postoculars; temporals 2+2 or 3; 9 or 10 supralabials, 4th to 6th, or 5th to 7th, touching the eye; posterior genials longer than the anterior, separated by small scales.

Green above, paler below, the interstitial skin on the sides of the body black (blue in life) and white, forming oblique lines; a white line at the lateral ventral keel; lips white; an indistinct dark stripe behind the eye. A juvenile male is light brown in colour, paler below, with a dark stripe along the whole side of the head bordering the white of the upper lip.

Total length: ♀ 1135, tail 300 mm.; length of the rostral appendage equals its distance from the eye.

Range. Tong-King (Is. de Norway, Tam-dao, Bavi); S. China (Kwangsi Province).

A rare species. Its habits are arboreal. Bourret (1939) mentions an individual caught on the verandah of a house.

Pope, in spite of differences in the description, unites *Probosciphis versicolor* Fan from Southern China with this species.

Genus CORONELLA.

Coronella Laurenti, 1768, Syn. Rept. (type *lievis*=*austriaca*); Boulenger, F. B. I. 1890, p. 308, and Cat. Sn. Brit. Mus. ii, 1894, p. 188; Werner, Zool. Jahrb. Jena, lvii, 1929, p. 125; Pope, Rept. China, 1935, p. 287; Mertens, Copeia, 1937, p. 70.

Zacholus Wagler, 1860, Nat. Syst. Amphib. p. 190 (type *austriaca*), *Meizodon* Fischer, 1856, Abh. Nat. Hamburg, iii, p. 112 (type *regularis*); Bogert, Bull. Amer. Mus. Nat. Hist. lxxvii, 1940, p. 46.

Wallopis Werner, 1929, Zool. Jahrb. Jena, lvii, 1929 p. 126 (type *brachyura*).

Maxillary teeth 12 to 20, increasing slightly in size posteriorly, last two largest and separated, or not, by a slight interval; head not, or slightly, distinct from neck: eye large, with

round pupil body cylindrical scales smooth with apical pits in 19 21 or 23 rows at mid body ventrals not or obtusely angulate laterally tail moderate or rather short subcaudals paired. Hypapophyses absent on the posterior dorsal vertebrae

Range Europe Africa north of the Equator India China 7 or 8 species one inhabiting India

The characters which separate *Coronella* from its near relations (*Coluber* *Oligodon*) are not well defined and the position of the species in the genus is still disputed. Werner

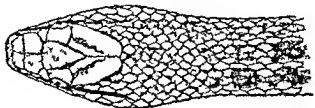


Fig 80 — *Coronella brachyura* x3

(1929) divides the genus into three groups namely a Palearctic (*Coronella*) an Asiatic for which he proposes the name *Wallopis* and an Ethiopian (*Meizodon*) the arrangement appearing to be based on geographical distribution rather than on morphological characters. Bogert has recently (1940) separated the Ethiopian species from the European ones his reasons for doing so being based on the characters of the hemipenis. A comparison of his description of the organ with mine of *brachyura* shows that they agree in all essential details. I can see no justification, however for separating *brachyura* from the European species and prefer to retain them all under one name.

127. *Coronella brachyura*.

Zamenis brachyurus Günther, 1866, Ann. Mag. Nat. Hist. (3) xviii, p. 27, pl. vi, fig. A (Poona: London); Blanford, J. A. S. Bengal, xxxix, 1870, p. 372; Anderson, P. Z. S., 1871, p. 176.—*Coronella brachyura*, Boulenger, F. B. I. 1890, p. 309, and Cat. Sn. Brit. Mus. ii, 1894, p. 206; Wall, J. Bombay N. H. S. xxix, 1923, p. 625; Lindberg, ibid. xxxv, 1932, p. 695.

Nostril large, between two nasals; internasals $\frac{1}{2}$ to $\frac{1}{3}$ as long as the prefrontals; frontal nearly as broad as long, in contact with a large preocular; loreal longer than high; 2 postoculars; temporals 2+2; 8 supralabials, 4th and 5th touching the eye; anterior genials larger than the posterior, the latter separated by two or three series of small scales. Scales in 23:23:19 rows; ventrals large, rounded; tail rather short. V. 200-224; C. 46-53; A. 1.

Hemipenis extending to the 13th caudal plate, not forked. The distal half is calyculate, the cups being large and with scalloped edges; the proximal half is spinose, two or three spines at the base being much larger than the others (bad specimen).

Olive-brown above, with indistinct light variegations on the anterior half of the body and head; lower parts whitish.

Total length: ♂ 515, tail 75; ♀ 450, tail 55 mm.

Range. Northern India. Poona district and Visapur, near Bombay; S.E. Berar.

A rare snake.

Genus OLIGODON.

Oligodon Boie, 1827, Isis, p. 519 (type *bitorquatus*); Boulenger, F. B. I. 1890, p. 317, and Cat. Sn. Brit. Mus. ii, 1894, p. 233; Wall, J. Bombay N. H. S. xix, 1909, p. 556, and Rec. Ind. Mus. xxv, 1923, p. 305; Pope, Rept. China, 1935, p. 300; Bourret, Serp. Indo-Chine, 1936, p. 249.

Simotes (not of Fischer 1817) Dum. & Bib., 1854, Erp. Gen. vii, p. 624 (type *russelli*); Boulenger, F. B. I. 1890, p. 309.

Rhynchocalamus Günther, 1864, P. Z. S. p. 491 (type *melanocephalus*).

Holarchus Cope, 1886, Proc. Amer. Phil. Soc. xxiii, p. 488, and Bull. U.S. Nat. Mus. 1887, p. 54; Stejneger, Herpet. Japan, 1907, p. 353; Pope, Rept. China, 1935, p. 288 (type *formosanus*); Bourret, Serp. Indo-Chine, 1936, p. 225.

Tripeltis Cope, 1886, Proc. Amer. Phil. Soc. xxiii, p. 487 (type *brevicauda*).

Dicraulax Cope, 1893, Amer. Naturalist, xxvii, p. 480 (type *trinotatus* = *purpurascens*).

Maxillary teeth 6 to 16, the posterior very strongly enlarged and compressed; palatine teeth well developed or vestigial; head short, not distinct from neck; head shields normal or reduced in number; eye moderate, with round pupil; rostral

large. Body cylindrical, scales smooth in all the species mentioned in this work, ventrals rounded or obtusely keeled laterally, subcaudals paired. Hyapophyses absent on the posterior dorsal vertebrae.

Common characters for the well-developed forms. Nostril in an elongated nasal, partly or completely divided by a vertical suture, rostral large, extending well on to the upper surface of the snout partly separating the internasals, loreal squarish, 1 pre and 2 postoculars, 3 or 4 infralabials in contact with the anterior genials, which are $1\frac{1}{2}$ to 2 times as

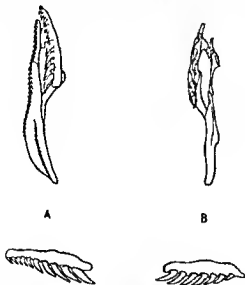


Fig. 61.—Palato-maxillary arch and maxilla of A. *Oligodon albovinctus* and B of *O. catenata*.

long as the posterior. The typical head pattern is shown in fig 62, with slight modifications the same head pattern is to be found throughout the genus.

Range. The majority of the species inhabit the Oriental Region, a few extend their distribution into the neighbouring islands of the Indo Australian Archipelago, to southern China and Formosa and to south western Asia.

Between 50 and 60 species are known.

Wall, quite rightly (1923), has united *Holarctus* with *Oligodon*, the latter being only a degenerate group of the

former. The passage from one to the other is gradual and no dividing line can be drawn. Degeneration has led to reduction in the number, but not always in the size, of the maxillary teeth; reduction in the number and size of the palatine teeth, but in no species are they entirely lost; reduction in the number of scales round the body and in the number of labials; loss of the loreal by fusion with the prefrontal or posterior nasal; loss of the internasals.

As shown also by Wall, and later by Pope, the structure of the hemipenis in this genus can be correlated to some extent with other morphological characters, and it appears to form a sound basis for phylogenetic speculation. This is expressed in the table (pp. 198-201). All the species as far as we know that inhabit the Peninsula of India have a spinose organ; most of those in the Indo-Chinese Region a non-spinose one. This difference, however, does not necessarily express phylogeny. Deep forking of the organ, as in the *cyclurus-formosanus* group, or the presence of a papilla-like process, as in the *laeniatus-barroni* and in the *torquatus-planiceps* groups, are I believe sounder evidences of relationship than the presence or absence of spines. The transition from the non-spinose to the spinose condition, or vice versa, is a comparatively small step, as shown in the *venustus-travancoricus* and the *dorsalis-erythrogaster-hamptoni* groups.

Not much has been written about the habits of the Oligodons. As far as is known all the species are oviparous, but I am not aware of any records of the deposition of eggs. *O. cyclurus*, the largest species of the genus, may have as many as 16 eggs (Wall); 3 to 6 is a more usual number.

As regards their diet the larger species have been known to eat small rodents, birds and lizards, but they do not appear to prey regularly upon them; as a genus the Oligodons are particularly fond of eggs, both avian and reptilian, and of the spawn of the amphibia. The smaller species, also, live largely upon insects, grubs and spiders. Meggitt records finding the stomachs of *O. cinereus* packed with insect remains. In disposition most of the species are quiet and inoffensive; *O. cyclurus*, however, in my experience is a most vicious creature.

Key to the Species of *Oligodon*

Name	So	Max teeth	Vent	Caud	Anal	Lab	Item pores	Head shields	Range
<i>cyclops</i>	(23) 19-21	9-10	165-195	37-59	1	8	Deeply forked no papillæ	Complete	N India. Indo-China.
<i>chinensis</i>	(17) 17	9-10	170-190	55-60	1	8	Deeply forked, no papillæ	Complete.	China Tong King
<i>graylandi</i> sp	19	10-12	162-208	53-63	1	7	Deeply forked, no papillæ	Complete.	E. Himalayas.
<i>macrurus</i>	17	13	145-162	76-83	1	7-8	As in <i>cyclops</i> no spines	Lateral present or absent	Annam
<i>formosanus</i>	19	10-11	165-182	46-52	1	8	Deeply forked, short papillæ no spines	Complete.	China; Tong-King
<i>lanceatus</i>	17	14-16	146-169	50-47	1	8	Deeply forked, large papillæ no spines	Complete	S. Indo-China.
<i>quadrinotatus</i>	19	14-16	147-167	38-45	1	8	As in <i>lanceatus</i>	Complete.	S. Indo-China.

	17	13-14	135-160	32-44	1	7-8	As in <i>tanaiatus</i> .	Complete.	E. Siam.
<i>barroni</i>	17	13-14	135-160	32-44	1	7-8	As in <i>tanaiatus</i> .	Complete.	E. Siam.
<i>albocinctus</i>	19-21	10-12	177-208	40-69	1	7	Not forked, papillae, no spines.	Complete.	Assam.
<i>melanozonotus</i>	17	8	171-173	42-45	2	6	Not known.	No loreal.	Assam.
<i>splendidus</i>	21	10-11	169-193	35-47	1	8	As in <i>cinereus</i> .	Complete, 4 prefrontals.	Burma.
<i>cinereus</i>	17-15	10-12	157-185	29-42	1	8	Not forked, papillae, no spines.	Complete.	Indo-China.
<i>joynsoni</i>	17	11-12	187-194	43-50	1	8	As in <i>cinereus</i> .	Complete.	N. Siam.
<i>woodmasoni</i>	17	8-10	180-190	46-57	1	6	Not forked, papillae, no spines.	Complete or loreal absent.	Andamans.
<i>torquatus</i>	15	15-16	144-159	27-34	2	7	Not forked, papillae, no spines.	Complete.	Burma.
<i>theobaldi</i>	17	15-16	164-180	30-42	2	8	Not forked, papillae, basal spines.	Complete.	Assam; Burma.
<i>cruentatus</i>	17	14-16	148-173	27-40	2	8	Not forked, spinous 2/3 papillae.	Loreal some- times absent.	Burma.
<i>planiceps</i>	13	10	132-145	22-27	2	4-5	Not forked, papillae, spines.	No loreal.	Burma.

Key to the Species of *Oligodon*—(continued).

Name	So	Max tooth	Vent	Caud	Anal	Lab	Hemipenis	Head shields	Range
<i>venustus</i>	17	7-8	138-163	27-36	2	7	Not forked dorsal, 1/3 spinose	No loreal	W Ghats
<i>transnomicus</i>	17	7	154-166	34-37	2	7	Not forked, spinose dorsal throughout	No loreal	W Ghats
<i>lambertius</i>	15	6-7	168-218	29-60	2	7	2/3 forked, spinose throughout	Complete	Ceylon; India.
<i>arvensis</i>	17	8-11	164-202	41-69	2	7	Not forked spinose throughout	Loreal present or absent	India.
<i>sublineatus</i>	16	6-8	134-161	23-37	2	7	Forked at tip, spinose throughout	Complete	Ceylon.
<i>calamarius</i>	15	7	127-152	20-34	2	7	Not forked, spinose throughout	Complete.	Ceylon.
<i>erythrorachis</i>	16	7 or 8	154	46	2	7	Not known	No loreal	Assam
<i>melanurus</i>	16	7	152-160	39-40	2	7	Not forked, spinose throughout	Complete	Darjeeling dist.

	17	7	120-142	23-30	2	7	Not forked, spinose throughout. Not known.	No loreal.	W. Ghats.
<i>affinis</i>	17	7	120-142	23-30	2	7			
<i>brevicauda</i>	15	7-8	158-173	25-29	2	7		No loreal, no internasals.	W. Ghats.
<i>calenata</i>	13	7	180-208	37-43	2	0	Not forked, spinose throughout. Not known.	No loreal, no internasals.	Burma.
<i>macdougalli</i>	13	—	200	39	2	7		No loreal.	Burma.
<i>dorsalis</i>	15	6-7	162-188	27-51	2	7	1/3 forked, flounced, basal spinos.	Complete.	Bengal; Burma.
<i>erythrogaster</i>	17	7-8	160-186	42-50	2	7	Not forked, flounced, no spinos.	No loreal.	E. Himalayas.
<i>hamptoni</i>	15	7	160-175	30-32	2	5	Not forked, spinose flouncos.	No internasals, loreals present or absent.	Burma.
<i>lacroixi</i>	15	10-12	162-178	25-33+	2	5	Not known.	No internasals, no loreal.	Tong-King.

128 *Oligodon cyclurus*

- Coronella cyclura* Cantor 1839 P Z S p 50 (no type loc given: coloured sketch in Bodleian Library Oxford) — *Simotes cyclurus* Boulenger F B I 1890 p 311 and Cat. Sn. Brit. Mus. i. 1893 p 219 and Ann. Mus. Civ. Genova, (2) xii, 1893, p 324; Smith, J. Nat. Hist. Soc. Siam, i. 1914 p 97 fig head; Wall, J. Bombay N. H. S. xviii 1908 p 780 — *Holarchus cyclurus* Smith, J. Nat. Hist. Soc. Siam, iv 1920 p 96
- Coronella violacea* Cantor 1839, P Z S p 50 (Rangpur Bengal: col. sketch in Bodleian Library)
- Simotes brachyotus* Günther 1864, Rept. Brit. Ind. p 217 (type loc. unknown: London)
- Simotes fasciolatus* Günther l. c. p 218 pl. xx, fig B (Petchabun, S. E. Siam: London)
- Simotes cochinchinensis* Günther l. c. p 219, pl. xx, fig C (Laos Mts. French Indo-China: London)
- Simotes brevicauda* Steudachner 1867, Reise Novara, Rept. p 61 pl. iii, figs 13-14 (Cochin China: Vienna)
- Simotes albocinctus* var. *dorsolateralis* Wall 1910 J. Bombay N. H. S. xix, p 898 (Jalpaiguri dist.: no type selected)
- Oligodon purpurascens* (non Schlegel) Wall, J. Bombay N. H. S. xxix, 1923 p 631 and xxx 19-5 p 815 and xxxi 1926, p 563 and Rec. Ind. Mus. xxv 19-3 p 328. Smith, Bull. Raffles Mus. No. 3 1930 p 83. Shaw & others J. Bengal N. H. S. iv 1940 p 144 — *Holarchus purpurascens* Cochran, Proc. U.S. Nat. Mus. lxxvii (ii) 1930 p 27
- Simotes smithi* Werner 1925 Sitz. Ber. Akad. Wiss. Wien, cxxxiv p 88 (Siam: Vienna) Smith, Ann. Mag. Nat. Hist. (10) 4, 1928 p 497
- Oligodon khemurus* Acharj & Ray 1935 Rec. Ind. Mus., xxviii, p 519 (North Eber Division, U.P.: Calcutta)

Normally 8 supralabials 4th and 5th touching the eye, a small subocular below the preocular. Scales in 19 or 21, rarely 17 or 23 rows. ♂ 161-185 ♀ 170-195, angulate laterally, C ♂ 42-68 ♀ 30-46. 21 scales at mid body is usual in specimens from Siam and the adjacent parts of Burma, 19 in other parts of its range, 23 occurs in two specimens from North Siam. 17 in two from Thua Lam S. of Hué Annam.

Hemipenis extending to the 12th caudal plate forked at the 5th, proximal to the fork there are a few large, irregular, convoluted folds or short soft papillae, distal to it are numerous small closely set transverse flanges, these become finer as they approach the tip of the organ where they form calyces. The sulcus lps are very prominent, there are no spines.

Total length ♂ 940 tail 140, ♀ 750, tail 120 mm.

Range. As given under the colour forms.

Five colour forms can be distinguished. The first four intergrade completely with one another, the fifth is provisionally referred to *cyclurus*.

I. Brown above (reddish or pinkish in life), with dark brown or black reticulations which are confined to the edges of the scales, uniform whitish below, with or without dark squarish

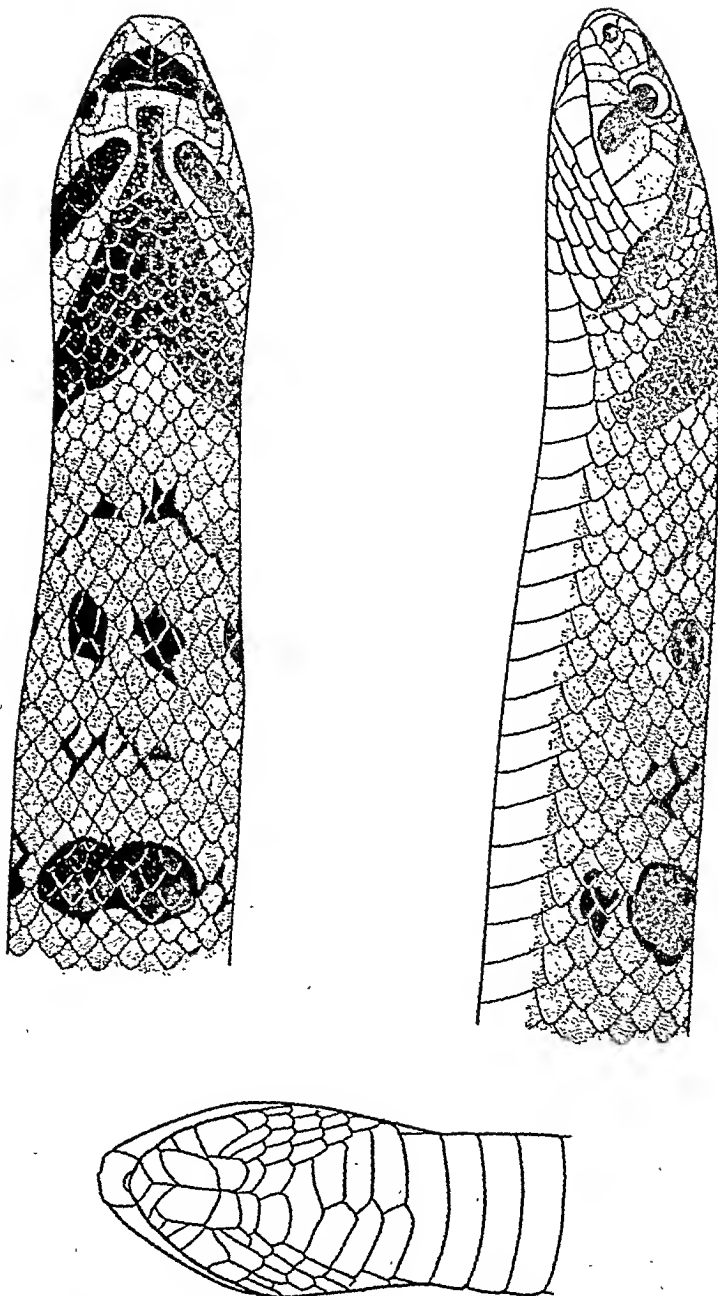


Fig. 62.—*Oligodon cyclurus*, Var. III. Dorsal, lateral and ventral views of head and neck.

spots at the outer margins of the ventrals, head markings as in fig 62 but never so distinct (*cyclurus*, *bicatenatus*) (fig 63, A B)

The whole of Burma and Tenasserim; Assam, Bengal as far west as Khaliganj, Rangpur district, Pulo Condore off the coast of Cochin China

II Fawn or buff coloured above (reddish or pinkish in life), whitish below. This form which is only an immaculate variety of Form I, may be found in any part of Tenasserim, Burma and Assam. Here I place Cantor's *violaceus* from Bengal, and also Acharj & Ray's *khariensis* from the United Provinces. The latter, known only from a single individual, represents the extreme western range of the species. Commenting on Forms I and II, Wall states "A fine series of 20 from Maymyo exhibit a wonderful variety in colour and markings ranging from a ground colour like a boiled prawn through ruddy browns to a deep cigar brown."

III Above with a dorsal series of large blackish or dark brown black edged spots, 9 to 18+2 to 4 in number, usually placed transversely, and separated by 3 more or less distinct dark cross-bars, the colour of which is confined to the edges of the scales (fig 63 D), belly usually unspotted in specimens from Siam spotted in those from other parts of its range (*cochinensis brevicauda smithi*).

The type of *fasciatus* is intermediate between this form and Form I (fig 63 C).

Siam as far south as lat 11° 15' N and the adjacent parts of Burma, Cambodia, Cochin China, Annam (Langbian plateau, Tourane)

IV Like I or II in dorsal markings with in addition four dark brown longitudinal stripes, 2 to 2½ scales wide, one on each side of the vertebral line, and a narrower and less distinct one on scale rows 3 and 4, belly uniform or spotted (*dorso-lateralis*).

North Siam, the whole of Burma and Assam.

V Light brown above with indistinct darker cross bars and with 12+3 conspicuous white, black-edged cross bars, which narrow on the side of the body, whitish below with squarish spots at the outer margins of the ventrals. This form is referred provisionally to *cyclurus*, it is a juvenile from Maymyo, Burma, and has 19 scales at mid body. V 172, C 50 the first 6 of which are undivided. It was presented by Col. Wall to the British Museum in 1924, but does not appear to have been described (fig 63 E).

O *cyclurus* is a fairly common snake in many parts of southern Indo-China, inhabiting the plains, and hills at low altitudes.

Cantor's type of *violaceus* was said to have 196 ventrals, a higher count than any recorded for that species, and to have come from Rangpur in Bengal, a locality outside its known range. It was described as being "reddish-violet, the scales

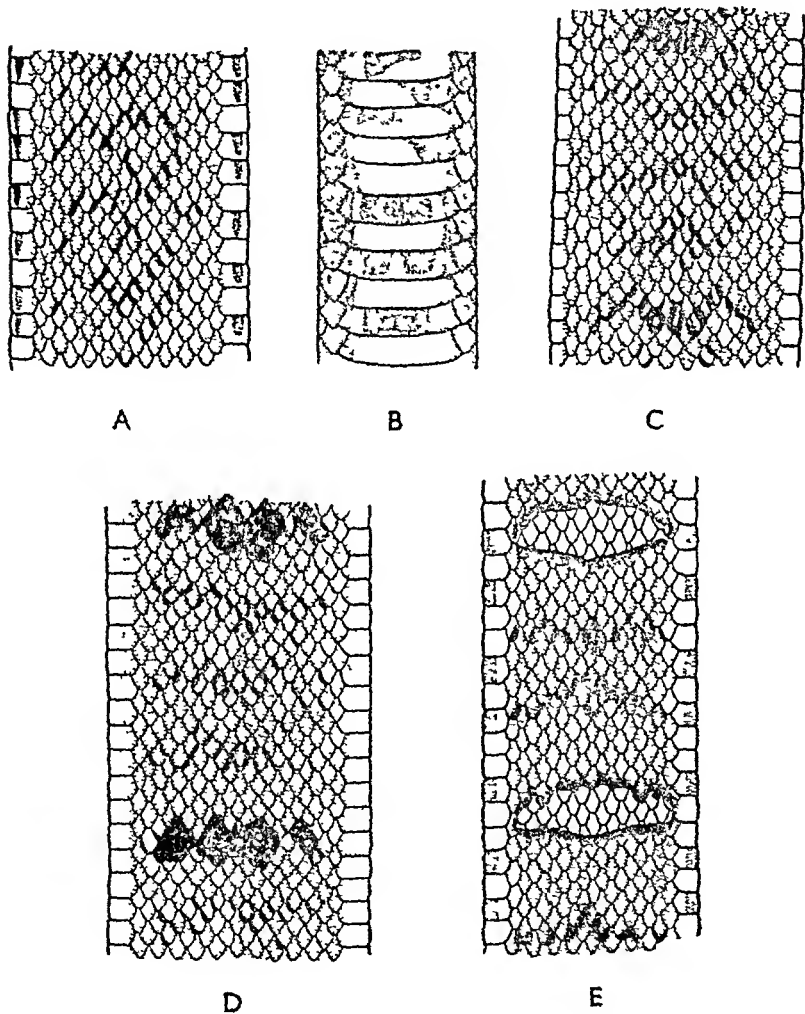


Fig. 63.—*Oligodon cyclurus*. A. Var. I, dorsal pattern; B. Var. I, ventral pattern; C. Dorsal pattern of the type of *fasciolatus*; D. Var. III, dorsal pattern; E. Var. V, dorsal pattern.

edged with white, pearl coloured underneath" There can be little doubt I think that Cantor had before him the immaculate form (Form II) of *cyclurus*. This form has not been met with at Kangpur, but I have examined three specimens of Form I from that locality.

Examination of the hemipenis of *purpurascens* from the Malay Peninsula shows that it is not conspecific with *cyclurus*, its organ having large papilla like processes and approximating to that which is to be found in the *laniatus* group. As I have stated elsewhere (Bull. Raffles Mus. 1930), the range of *purpurascens* in the Malay Peninsula does not extend north of Patani, between that locality and the southernmost range of *cyclurus*, lat. $11^{\circ} 15'$, there is an area of country some 300 miles in length from north to south in which no member of the genus *Oligodon* has yet been found.

Simotes obscurus and *S. crassus*, both of Theobald, Cat. Rept. Asiat. Soc. Mus. 1889, p. 48, type-localities unknown, both in Calcutta, must, on the character of their hemipenes, be referred to *purpurascens*.

129 *Oligodon chinensis*

- Simotes chinensis* Günther, 1858, Ann. Mag. Nat. Hist. (6) 1, p. 16 (Lushan, Kiangsi: London); Boulenger, Cat. Sn. Brit. Mus. 11, 1894, p. 228, pl. ix, fig. 1—*Holarchus chinensis* Pope, Rept. China, 1935, p. 291, pl. xi, fig. F, G, H, I.
Simotes longicauda Boulenger, 1903, Ann. Mag. Nat. Hist. (7) xii, p. 351 (Man-son Mts., Tong King: London).
Holarchus violaceus longicauda (non Boulenger) Bourret, 1936, Serp. Indo-Chine, p. 279.

Like *cyclurus* in general scalation and size, but with only 17 scale rows, usually no subocular, and usually only 1 anterior temporal.

Hemipenis extending to the 12th caudal plate, forked at the 5th, for the greater part of its length it has numerous small, closely set, obliquely placed fimbriae which at the extreme tip of the organ form calyces, starting from near the fork and extending to near the tip there is a prominent diagonal ridge which has a free proximal end; this free end possibly foreshadows the papilla-like process which is developed strongly in the *cinereus* and *laniatus* groups, there are no spines.

Coloration as in *cyclurus* Form III, but the dorsal spots constantly narrower.

Range. A Chinese species that just extends its range into the Indo-Chinese region (Hanan, Tong King).

130. *Oligodon juglandifer*.

Simotes albocinctus var *juglandifer* Wall, 1909, J. Bombay N. H. S. *ix*, p. 349.—*Simotes juglandifer*, Wall, *ibid.* *xx*, 1911, p. 1162 (Tindharia, Darjeeling dist.).—*Oligodon juglandifer*, Wall, *ibid.* *xxix*, 1923, p. 630, and *Rec. Ind. Mus.* *xxv*, 1923, p. 327.

The type of *juglandifer*, said to be in the British Museum, cannot now be traced, but I have examined two specimens identified by Wall and now in the Indian Museum. They are from Gopaldhara, Darjeeling district.

In general proportions and scalation, in the character of the hemipenis and in coloration, like *cyclurus*; differing in having more maxillary teeth; 7 supralabials, the 4th or 3rd and 4th touching the eye, the 6th in one specimen excluded from the labial border, and in having a higher ventral and subcaudal count (*vide* Wall). Colour pattern as in *cyclurus*, Form III.

Range. Known with certainty only from the Darjeeling district.

My reasons for placing this species in the *cyclurus* group and not with *albocinctus* are given in the Key.

131. *Oligodon macrurus*.

Simotes violaceus macrurus Angel, 1927, *Bull. Mus. Hist. Nat. Paris*, *xxxiii*, p. 497 (Pointe Lagan, Southern Annam: Paris).—*Holarchus violaceus macrurus*, Bourret, *Serp. Indo-Chine*, 1936, p. 238.

Loreal present or absent; a small subocular below the preocular present or absent; 7 or 8 supralabials, 3rd and 4th, or 4th and 5th touching the eye; 1 anterior temporal. Scales in 17 rows. V. 143–152, angulate laterally; C. 76–83.

Hemipenis extending to the 29th caudal plate, forked opposite the 6th; in structure like that of *cyclurus*.

To this species I refer a second specimen obtained by me from Nha-trang, S. Annam, just north of Pointe Lagan. It differs from the type in having no loreal, and no subocular, characters which in this genus are known to be variable.

In coloration it is light brown above with an indistinct reticulation of darker markings; whitish below; head with a dark stripe below the eye, another behind the mouth, and a wide-angled chevron, its apex continued forwards to the parietal shields, on the nape.

Total length: ♂ 365, tail 115 mm.

132 *Oligodon formosanus*.

- Simotes formosanus* Günther 1872, Ann. Mag. Nat. Hist. (4) ix, p. 20 (Takao Formosa London); Boulenger, Cat. Sn. Brit. Mus. ii, 1894, p. 222 pl. viii, fig. 2.—*Holarchus formosanus*, Pope, Rept. China, 1835, p. 293, pl. xi, fig. D, E.
Simotes hainanensis Boettger, 1894, Ber. Senck. Ges. p. 133, pl. iii (Hainan).
Holarchus naniotus Barbour, 1908, Bull. Mus. Comp. Zool. Harvard, ii, p. 313 (Tingnan, Hainan; Harvard).
Holarchus formosanus violaceoides Moll, 1930, Sitz. Ber. Ges. Nat. Fr. Berlin, p. 323 (Yaoshan, Kwangsi).
Holarchus formosanus brunnea Moll, l. c. s. (Yaoshan, Kwangsi).

Like *cyclurus* in general proportions and scalation; scale rows constantly 19, usually only 1 anterior temporal. V 165-182, angulate laterally, C 46-52, for specimens from the Indo Chinese region.

Pope has given an excellent account of the peculiar hemipenis of this snake, and I quote his description in full: "The hemipenis is forked opposite the 6th to 7th subcaudal plates; while one branch extends to the 15th, the other to the 17th plate. There are no spines, but an extensive proximal area of cross folds or flounces that gradually merge distally into a much less extensive calyculate region, the calyces of which are shallow and smooth-edged. Beyond the point of forking, the sulcus is laterally asymmetrical, being bounded on one side by a raised lip, which, in turn, is backed by a prominent ridge, on the other, by a low, wide area of smooth-edged calyces. The ridge that backs the sulcus is flounced proximally, calyculate distally, and runs into a large papilla-shaped process at the tip of the organ. This process has a calyculate surface."

Coloration as in *cyclurus* Form I, namely, an indistinct reticulation of blackish transverse markings confined to the edges of the scales, belly uniform or spotted.

A Chinese species which extends its range into the Indo-Chinese region as far as Upper Tong King.

133 *Oligodon taeniatus*.

- Simotes taeniatus* Günther, 1851, P. Z. S. p. 189, and Rept. Brit. Ind. 1854, p. 216 pl. ix, fig. A (Cambodia London); Boulenger, Cat. Sn. Brit. Mus. ii, 1894, p. 227 (in part); Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 98, Barbour, Proc. N. Engl. Zool. Club, iv, 1909, p. 70.
Simotes taeniatus var. *monkoti* Boulenger, 1914, J. Nat. Hist. Soc. Siam, i, p. 70.—*Holarchus taeniatus monkoti*, Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930, p. 22; Bourret, Serp. Indo-Chine, 1926, p. 247.

Eight supralabials, 4th and 5th touching the eye; a small

subocular below the preocular present or absent ; 1 anterior temporal. Scales in 17 rows. V. 146-169, angulate laterally; C. 30-47.

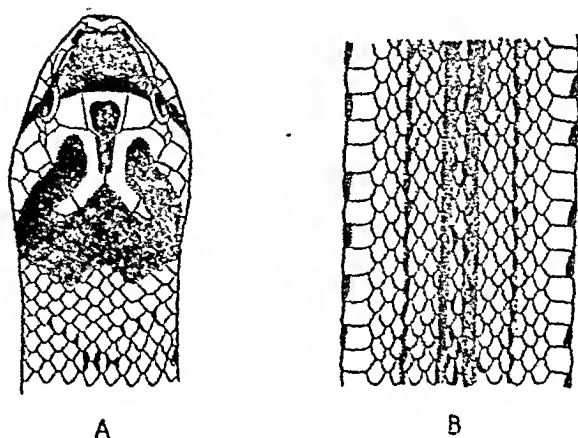


Fig. 64.—*Oligodon tæniatus*.
A. Dorsal view of head. B. Dorsal pattern.

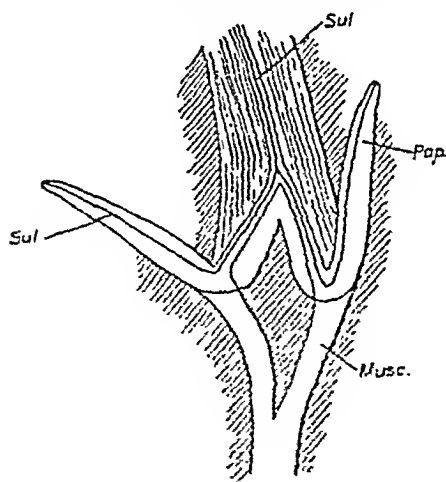


Fig. 65.—Plan of hemipenis of *Oligodon tæniatus*. The papilla-like processes have been separated from the surrounding tissue.
musc., retractor muscle ; pap., papilla ; sul., sulcus spermaticus.

Hemipenis extending to the 12th caudal plate, forked at the 5th ; proximal to the fork it is calyculate or has coarse folds ; distal to it (in each fork) there is a smooth membranous

sheath which encloses a large elongate smooth papilla-like process, its free end towards the proximal end of the hemipenis; the sulcus spermaticus extends down the membranous sheath and then doubles backwards along the process to end at its tip, there are no spines. The two papillæ of each hemipenis are of equal length.

Brown above, with 4 dark brown longitudinal stripes, the dorsal pair edge the vertebral scales, which are pale in colour, the outer two, on scale rows 3 and 4, stop at the vent; whitish below (coral red in life), with numerous black aquarish spots on either side of the ventral shields or united to form a median bar. Head markings as in fig 64, a black spot above at the base of the tail, another near the tip, occasionally one or both may be absent. Four specimens from the neighbourhood of Saigon have a conspicuous yellow vertebral stripe and no dorsal spots on the tail.

Total length ♂ 340 tail 60, ♀ 330, tail 45 mm

Range Siam between lat 12° and 16° N, Cambodia, Cochin China

Common in the neighbourhood of Bangkok.

Boulenger in proposing the name *mouhoti* (J N II S Siam, p 70) evidently overlooked Günther's correction (1864) that the type of *teniatus* had 17 scale rows and not 19 as first described.

134 *Oligodon quadrilineatus*

Sinotes quadrilineatus Jan. 1866, Nouv. Arch. Mus. Paris, ii, p 7 and Icon. Gen. 1865 p 12, pl. iv, fig 3 (Siam: Paris: in part)

Sinotes teniatus Boulenger Cat. Sa. Brit. Mus. ii 1894, p 227 (in part) — *Holarchus teniatus teniatus* Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930 p 29

Like *teniatus* but with 19 scale rows and without black spots on the tail.

Range the same

Common in the neighbourhood of Bangkok

The types of *quadrilineatus* are four in number, two are typical *quadrilineatus*, the other two *teniatus*

135 *Oligodon barroni*

Sinotes barroni Smith 1916 J. Nat. Hist. Soc. Siam, ii, p 46, pl. — fig 4 (Srisacha, S E Siam: London)

Holarchus teniatus caudocinctus Bourret, 1934 Bull. Gen. Instr. Pub. Hanoi, May p. 173 (Caude, near Nha-trang S Annam: Paris)

Seven sometimes 8, supralabials, 3rd and 4th or 4th and 5th touching the eye, 1 anterior temporal. Scales in 17 rows. 130-180, angulate laterally, C 32-44. Hemipenis as in *teniatus*

Light brown above with large dark brown, light edged spots, 10 to 12+3 or 4 in number, transversely arranged; they are more or less indented mesially, sometimes completely bisected, forming pairs, and confluent with a smaller spot on either side; between the spots are 3 more or less distinct cross-bars, the colour of which is confined to the edges of the scales; yellowish-white below (coral red in life), with large

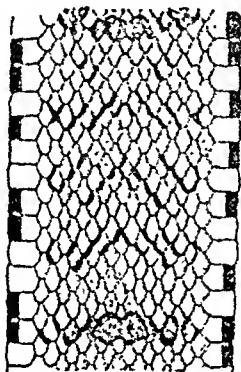


Fig. 66.—Dorsal pattern of *Oligodon barroni*.

dark squarish spots placed at the sides of the ventrals; head markings as in *taeniatus*.

Total length: ♂ 340, tail 60; ♀ 380, tail 70 mm.

Range. South-eastern Siam (Sriracha district; Dong Rek Mts.); Koh Lam in the Bight of Bangkok; S. Annam.

136. *Oligodon albocinctus*.

Coronella albocincta Cantor, 1839, P. Z. S. p. 50 (Cherrapungi, Assam: col. sketch in Bodleian Lib.).—*Simotes albocinctus*, Boulenger, F. B. I. 1890, p. 312, and Cat. Sn. Brit. Mus. ii, 1894, p. 220; Annandale, Rec. Ind. Mus. viii, 1912, p. 48; Venning, J. Bombay N. H. S. xx, 1910, p. 338; Wall, ibid. xix, 1909-1910, pp. 348, 898, and xxii, 1914, p. 756, col. pl.—*Oligodon albocinctus*, Wall, Rec. Ind. Mus. xxv, 1923, p. 326, and J. Bombay N. H. S. xxix, 1923, p. 631, and xxx, 1925, p. 815, and xxxi, 1926, p. 563; Shaw & Shebbeare, J. Darjeeling N. H. S. iv, 1929, p. 29; Shaw & others, ibid. xiv, 1940, p. 143. *Coronella punctulatus* Gray, 1853, Ann. Mag. Nat. Hist. (2) xii, p. 389 (Khasi Hills: London).—*Simotes punctulatus*, Günther, Rept. Brit. Ind. 1864, p. 217. *Simotes amabilis* Günther, 1868, Ann. Mag. Nat. Hist. (4) p. 416, pl. xvii, fig. A (Arakan Hills: London).

Seven supralabials, 3rd and 4th touching the eye; 1 anterior temporal. V. 177-208, angulate laterally; C. 40-69.

Hemipenis extending to the 24th caudal plate, not forked; externally and upon its ventral surface there is a deep, slightly

annous sulcus, which divides the organ partly into two for $\frac{1}{2}$ of its length. On opening the organ the following structures are seen.—Proximal to the sulcus it is calyculate, the calyces being smooth-walled and rather irregular in shape; the distal $\frac{1}{2}$ have two narrow areas which are strongly flounced; they are separated from one another by the sulcus; the tip of the organ has smooth, longitudinal folds and a short pointed papilla, the base of which is attached to the tip of the organ. Two distinct colour forms can be defined, intergradation between them is rare.

I. Brown above (reddish or pinkish in life) with white, yellow or fawn coloured black-edged cross-bars, 19 to 27+4 to 8 in number, belly whitish, with large black squarish spots at

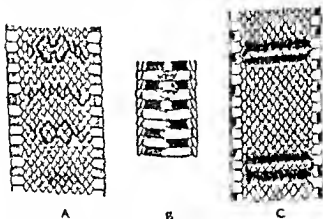


Fig. 67.—*Oligodon allonectus*. A, B. Dorsal and ventral patterns of *forma typica* (B.M. 1925 9 11-18) C. Dorsal pattern of Var. II. (B.M. 60 11 10 135)

the outer margins of the ventrals; head light brown above, with the typical pattern. *O. amabilis* differs from this form in having 55 cross-bars, due perhaps to doubling of the usual number (*alloecius*, *puncticulatus*).

II. Brown above with black or dark brown black-edged cross-bars, these may be simple bars, or large rounded spots, or with each spot longitudinally bisected. In this form the dark cross-bars may disappear entirely with age, leaving the upper parts an almost uniform brown coloration.

Range of both forms. The Eastern Himalayas as far west as Sikkim; Bengal (Rangpur, Kaligang), the whole of Assam, Chittagong province; Burma as far south as the Arrakan Hills.

A common snake in the Eastern Himalayas up to 5,000 ft. altitude ; rare in Burma.

It is possible that Forms I and II are distinct species, but in the absence of any morphological characters by which to distinguish them, I have placed them together. As already

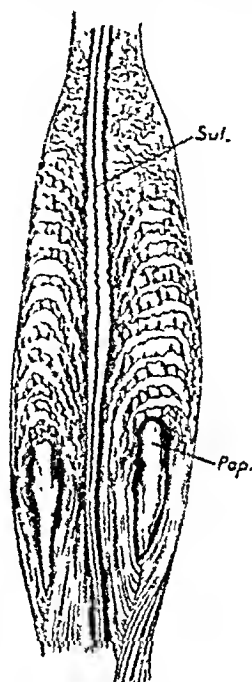


Fig. 68.—Hemipenis of *Oligodon albocinctus*.
pap., papilla ; sul., sulcus spermaticus.

stated, intergradation, if it occurs at all, is extremely rare, nor can any geographical division of the two forms be made. The status of these two forms is closely paralleled by that of *O. tæniatus* and *O. quadrilineatus*.

137. *Oligodon melazonotus*.

Oligodon erythrorhachis (non Wall), Annandale, 1912, Rec. Ind. Mus. viii, p. 48.

Oligodon melazonotus Wall, 1922, Rec. Ind. Mus. xxiv, p. 29 (Upper Rotung Valley, Abor Hills : Calcutta and London), and xxv, 1923, p. 320, and J. Bombay N.H.S. xxix, 1923, p. 630.

No loreal, the prefrontal in contact with the 2nd labial ; 6 supralabials, 3rd and 4th touching the eye ; 1 anterior temporal. Scales in 17 rows. V. 171–173, not angulate laterally ; C. 42–45.

Light brown above with a series of whitish black-edged cross-bars, which in the adult are entirely black, whitish below with squarish black spots which sometimes occupy the whole of the ventral shield; head light brown or buff above with the typical markings, which are edged with black.

Total length 520, tail 85 mm

Only 2 specimens are known, a juvenile and an adult, both of which are females

133 *Oligodon splendidus*.

Simotes splendidus Gunther, 1875, P. Z. S. p. 231, pl. xxxii ('Wynnaad' London), Boulenger, P. B. L. 1890, p. 310, and Cat. Sn. Brit. Mus. n. 1894 p. 217; Wall & Evans, J. Bombay N. H. S. Mus. 1901, p. 537; Veronig, ibid. xxii, 1914 p. 164, Evans, ibid. xvi, 1903, p. 362, Wall, ibid. xviii, 1903 p. 181—*Oligodon splendidus*, Wall, ibid. xxx, 1925, p. 516, and Rec. Ind. Mus. ii, 1903, p. 105, and xxv, 1923, p. 33.

Rostral thick and prominent, a pair of small shields behind the rostral, interposed between the internasale and prefrontals,



Fig 69.—Dorsal pattern of *Oligodon splendidus* (B.M. 74.4.29 55)

completely separating the former; 4 prefrontals; 8 supralabials, 4th and 5th touching the eye, a small subocular below the preocular, 2 anterior temporals. Scales in 21 rows. V. 169-193, angulate laterally; C 35-47.

Hemipenis extending to the 19th caudal plate; characters as in *cinereus*.

Light brown above, each scale with a dark centre, and with a series of large, dark brown spots, 14 to 17+3 to 5 in number, mesially indented in front and behind; these spots are edged with blackish and outside again with buff; flanks with a series of smaller spots; whitish or yellowish below, with dark brown spots on the outer margins of the ventrals; head spotted with brown; a dark chevron on the nape, its apex extending on to the frontal.

Total length: ♂ 710, tail 100; ♀ 730, tail 100 mm.

Range. Burma. The Valleys of the Irrawaddy and Chinwin between lat. 20° and 24°. Found chiefly in the plains; not uncommon, according to Wall, in the restricted area in which it occurs.

139. *Oligodon cinereus*.

Simotes cinereus Günther, 1864, Rept. Brit. Ind. p. 215 (Cambodia: London).—*Oligodon cinereus*, Smith, Rec. Ind. Mus. xlii, 1940, p. 481.

Simotes swinhonis Günther, l. c. s. pl. xx, fig. E (Amoy, China London).

Simotes multifasciatus Jan, 1865, Icon. Gen., Liv. 12, pl. iv, fig. 2.

Simotes semifasciatus Anderson, 1871, J. A. S. Bengal, xl, p. 16 (Naga Hills, Assam: Calcutta).

Holarchus dolleyanus Cope, 1894, Pr. Acad. Nat. Sci. Philad. p. 423, pl. 10 (Hainan).

Simotes violaceus, (non Cantor), Boulenger, F. B. I. 1890, p. 312, and Cat. Sn. Brit. Mus. ii, 1894, p. 222, and Ann. Mus. Civ. Genova, (2) xiii, 1893, p. 325; Wall & Evans, J. Bombay N. H. S. xiii, 1901, p. 618; Meggitt, Nature, 1931, cxxviii, p. 413.—*Oligodon violaceus*, Wall, Rec. Ind. Mus. xxv, 1923, p. 318, and J. Bombay N. H. S. xxix, 1923, p. 628, and xxx, 1925, p. 814.—*Holarchus violaceus*, Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930, (ii) p. 29; Pope, Rept. China, 1935, p. 297, fig.; Smith, J. Nat. Hist. Soc. Siam, iv, 1920, p. 96.

Simotes inornatus Boulenger, 1914, J. Nat. Hist. Soc. Siam, i, p. 68 (Sriracha, S.E. Siam: London); Smith & Kloss, ibid. i, 1915, p. 245; Smith, ibid. iv, 1920, p. 96.

Simotes violaceus pallidocinctus Bourret, 1934, Bull. Gen. Instr. Pub. Hanoi, Sept., p. 18, and Serp. Indo-Chine, 1936, p. 241 (Saigon: Paris).

Holarchus violaceus tamdaoensis Bourret, 1935, l. c. s., April, p. 265, and Serp. Indo-Chine, 1936, p. 239 (Tam-dao, Tong-King: Paris).

Normally 8 supralabials, 4th and 5th touching the eye; a small subocular below the preocular present or absent; usually 1 anterior temporal. Scales in 17 rows, except in south-eastern Siam, where there are 15. V. ♂ 151–175; ♀ 165–185, angulate laterally; C. ♂ & ♀ 29–43.

Hemipenis extending to the 14th caudal plate, not forked; the proximal end is calyculate, the calyces gradually merging

into a thin membranous longitudinally pleated area which contains two large spongy papilla like processes of unequal length there are no spines. Pope (1935) has also given an account of the hemipenis. He stresses other points in its structure but in substance our two descriptions do not greatly differ from one another.

Four colour forms can be distinguished all except Form IV intergrading with one another.

I Greyish or redish brown or pinkish above without dark markings. belly unspotted or powdered with grey, or with indistinct greyish square spots at the sides of the ventral shields. head uniform brown above (*cinerus*).

Siam as far south as lat $12^{\circ} 30'$ in the Peninsula, Tenasserim. Burma as far north as Toungyi. Cambodia.

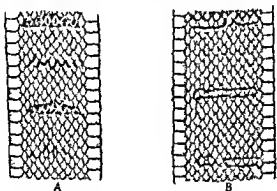


Fig 70—*Oligodon cinereus*

A. Dorsal pattern of Var III. (B.M. 1900 9.20 14) and B of Var IV

II The black edges of some of the scales forming more or less distinct dark cross bars or reticulations, head uniform brown above (*multifasciatus*, *sinhensis*, *semifasciatus*).

Siam and southern Burma, French Indo China. Hainan, Hong Kong, Southern China.

III Above with very distinct black cross bars, alternating with one sometimes two indistinct ones, belly heavily marked with squarish spots at the outer margins of the ventrals, head markings very variable, in some only a nuchal chevron, in others a complete pattern of the typical form (*tamdaoensis*).

Bengal (Chittagong Hills), Assam, Burma north to Suifu Hka (lat $26^{\circ} 26' N$) and south to lat 20° , Tong King (Tam-dao).

IV. Greyish-brown above with whitish or light brown, black-edged cross-bars, 27 to 34+3 to 4 in number; belly uniform whitish or spotted with grey; nape with a dark chevron in the young, disappearing in the adult (*pallidocinctus*).

Cochin China (Saigon district); Thua Lun, S. of Hué, Annam; Pulo Condore, S. China Sea.

Specimens from the extreme south-eastern corner of Siam (south of Petriu) and eastwards to the adjacent territory of Cambodia, have only 15 scale-rows at mid-body; they may belong to colour form I or II. (*inornatus*).

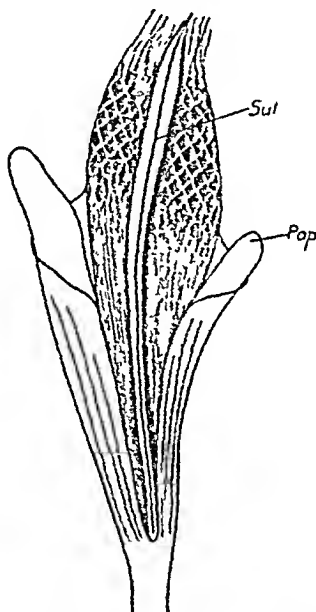


Fig. 71.—Hemipenis of *Oligodon cinereus*. The papilla-like processes have been separated from the surrounding tissue.

O. cinereus (Forms I and II) extends its range into the Malayan region. It has not been met with in the Peninsula south of lat. 11°, but has been found in North Borneo.

Total length: ♂ 650, tail 95, Siam; ♂ 720, tail 100, ♀ 760, tail 75 mm. (Assam).

My reasons for discarding the name *violaceus* have been given under *cyclurus*, p. 205.

Holarchus violaceus poilani Bourret, Bull. Gen. Instr. Pub. Hanoi, Dec. 1939, p. 26, from Dong Tam Ve, Central Annam, may belong here. Not seen by me.

140 *Oligodon joynsoni*.

Simotes longicauda joynsoni Smith, 1917 J Nat Hist Soc Siam, v p 276 (Muang Ngow: London); Pope, Rept. China, 1923, p 273

Eight supralabials, 4th and 5th touching the eye, a small subocular below the preocular present or absent, 1 or 2 anterior temporals. Scales in 17 rows. V. 187-195, feebly angulate laterally, C 43-50

Hemipenis as in *cinctus*

Dark purplish brown above with strong black reticulations forming more or less distinct cross bars, each alternate one



Fig 72.—Dorsal pattern of *Oligodon joynsoni* (B.M. 1921 4.1.2.)

with a black transversely placed spot, belly whitish (red in life) uniform or heavily marked with rectangular black spots, head with the typical markings

Total length ♂ 760, tail 105 mm

Range North Siam (Me Wang and Muang Ngow)

Known from 4 specimens

141 *Oligodon woodmasoni*.

Simotes woodmasoni Selater 1891, J A. S. Bengal, lx, p 235, pl. vi fig 2 (Andaman and Nicobars Is. Calcutta), Annals Ind. (7) 1905 pp 173-175, Boulenger Cat. Sn. Brit. Mus. II, 1894 p 723—*Oligodon woodmasoni*, Wall. Rec. Ind. Mus. xxi, 1923 p 375, and J. Bombay N. H. S. xix, 1923, p 630

Loreal present or absent, 6 supralabials, 5th largest, 3rd and 4th touching the eye, or 3rd prevented by a small presubocular, 1 anterior temporal. Scales in 17 rows. V 180-190, angulate laterally, C 46-57

Hemipenis extending to the 16th caudal plate, not forked, the proximal $\frac{1}{2}$ is flounced, the folds being transversely arranged, and towards the tip form calyces, distally there are two large papilla-like processes of spongy structure, one nearly twice as long as the other, they are enclosed in a calyculate sheath, there are no spines

Dark brown or blackish above with narrow yellow longitudinal stripes, a vertebral and 3 lateral; ventrals whitish or yellowish, the central portion of the shield dark brown and with a dark spot at the outer edge; head with the typical markings. Total length: ♂ 620, tail 120 mm.

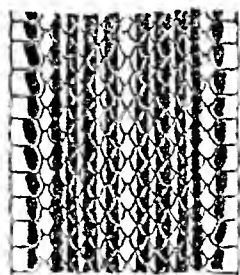


Fig. 73.—Dorsal pattern of *Oligodon woodmasoni*.

Range. The Andaman and Nicobar Islands.

I have examined three specimens.

Very closely allied to the Malayan *octolineatus*, from which it is obviously derived.

142. *Oligodon torquatus*.

Simotes torquatus Boulenger, 1888, Ann. Mus. Civ. Genova, (2) vi, p. 597, pl. v, fig. 1 (Bhamo: London), and F. B. I. 1890, p. 316, and Cat. Sn. Brit. Mus. ii, 1894, p. 232.—*Oligodon torquatus*, Wall, J. Bombay N. H. S. xxix, 1923, p. 626, and xxx, 1925, p. 814, and Rec. Ind. Mus. xxv, 1923, p. 309.

Seven supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 15 rows. V. 144–159, feebly angulate laterally; C. 27–34.

Hemipenis extending to the 8th caudal plate, not forked. Want of material prevents a proper description of the organ; the proximal portion appears to be longitudinally plicate and at the extremity are two spongy papilla-like processes; there are no spines.

Brown or greyish-brown above, with an indistinct reticulation of black and white, the colours being confined to the edges of the scales, and with 4 indistinct blackish longitudinal stripes or series of spots, 2 vertebral and 2 lateral; whitish below, with squarish black spots which are confined to the posterior part of the body, and may be almost absent; head with obscure blackish markings and a broad dark bar on the nape.

Total length: ♀ 270, tail 30 mm. (292, Wall).

Range. Found only in the hilly country of the Valley of the Irrawaddy between Myitkyina and Bhamo. A common snake at Myitkyina* (Wall).

* Pronounced Mitchinar.

143 *Oligodon theobaldi*.

Simotes theobaldi Günther, 1868, Ann. Mag. Nat. Hist. (4) 1, p. 417 (Pegu: London). Boulenger, F. D. I. 1890, p. 315, and Cat. Sn. Brit. Mus. ii. 1894, p. 231; Wall & Evans, J. Bombay N. H. S. xiii, 1909, p. 349; Wall, ibid. xliii, 1914, p. 170; Prater, ibid. xxvii, 1920, p. 175—*Oligodon theobaldi*, Wall, J. Bombay N. H. S. xxix, 1923, p. 672, and xxx, 1925, p. 815, and Rec. Ind. Mus. xiv, 1923, p. 322.
Simotes beddomii Boulenger, 1890, F. D. I. p. 314, and Cat. Sn. Brit. Mus. ii, 1894, p. 229, pl. ix, fig. 2 (Wynaud: London).

Eight supralabials, 4th and 5th touching the eye; 1 anterior temporal. Scales in 17 rows. V 164-180, not angulate laterally. C 30-42.

Hemipenis extending to the 18th caudal plate, not forked; the basal half of the organ is spinose, the spines being relatively

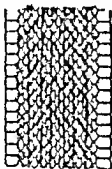


Fig. 74.—Dorsal pattern of *Oligodon theobaldi*.
 (B.M. 1925 4.2.36-39)

small and of uniform size; the distal half contains two large spongiform papilla-like processes.

Light brown above with narrow closely set transverse or angular cross bars, the colour being confined largely to the margins of the scales, and with 4 more or less distinct dark brown longitudinal stripes, 2 broad ones, one on each side of the vertebral line, and 2 narrower lateral ones on scale rows 2 and 3, yellowish below with or without squarish black spots at the outer margins of the ventrals; head with the typical markings.

Total length: ♀ 390, tail 47 mm.

Range Assam (Tura and Garo Hills); Burma as far north as Myitkyna, and south to Mergui. Found in the plains and in the hills; Wall states that it is common at Mandalay.

144. *Oligodon cruentatus*.

Simotes cruentatus Günther, 1868, Ann. Mag. Nat. Hist. (4) i, p. 417 (Pegu: London); Boulenger, F. B. I. 1890, p. 315, and Ann. Mus. Civ. Genova, (2) xiii, 1893, p. 325, and Cat. Sn. Brit. Mus. ii, 1894, p. 231; Wall & Evans, J. Bombay N. H. S. xiii, 1900, p. 349.—*Oligodon cruentatus*, Wall, J. Bombay N. H. S. xxix, 1923, p. 629, and Rec. Ind. Mus. xxv, 1923, p. 317.

Closely allied to *theobaldi*; normally 8 supralabials, 4th and 5th touching the eye; 1 anterior temporal; loreal sometimes absent. Scales in 17 rows. V. 148–173, angulate laterally; C. 27–40.

Hemipenis as in *theobaldi*, except that the spinose area is larger and the spines gradually increase in size as they approach the base of the organ.

Greyish-brown above with or without indistinct darker reticulations, and with or without 4 indistinct dark brown longitudinal stripes as in *theobaldi*; yellowish below with squarish black spots on the ventrals; tail in the young with 2 black annuli, one at the base and the other near the tip; in the adult these are confined to the under-surface of the tail; head in the young with a dark transverse mark behind and dark spots in front in the position of the typical pattern; in the adult they are almost or entirely lost.

Total length: ♂ 355, tail 55; ♀ 365, tail 45 mm.

Range. Burma between lats. 16° and 20° N. Wall records it from Mandalay and Bhamo, but I have not been able to trace the specimens.

145. *Oligodon planiceps*.

Simotes planiceps Boulenger, 1888, Ann. Mus. Civ. Genova, (2) vi, p. 597, pl. v, fig. 2 (Minhla, Burma: Genoa), and F. B. I. 1890, p. 316, and Cat. Sn. Brit. Mus. ii, 1894, p. 232.—*Oligodon planiceps*, Wall, J. Bombay N. H. S. xxix, 1923, p. 626, and Rec. Ind. Mus. xxv, 1923, p. 307.—*Holarchus planiceps*, Pope, Rept. China, 1935, p. 289.

Rostral entirely separating the internasals; no loreal; 5 sometimes only 4 supralabials, 3rd touching the eye; 1 anterior temporal.

Scales in 13 rows. V. 132–142, angulate laterally; C. 22–27.

Hemipenis not forked, spinose, with papillæ (*vide* Pope).

Brown above with an indistinct reticulation of darker markings; yellowish below, the ventrals and subcaudals with squarish black spots which are mostly confined to the outer margins of the shields; head markings as in *cruentatus*.

Total length: ♀ 230, tail 22 mm.

Range. Lower Burma (Rangoon and Tharrawaddy districts). Four specimens are known.

146 *Oligodon venustus*.

Xenodon venustus Jerdon, 1833 J A S Bengal, xxi, p 824
 (N. Cana a d at type lost) — *Sinotes venustus* Gunther Rept
 Brit Ind. 1864 p 213 — *Oligodon venustus* Boulenger F B L
 1890 p 317 and Cat. Sa. Brit Mus. ii, 1894, p 235 Wall.
 J Bombay N H S xxi, 1914 p 169 and xvi, 1919 p 56
 and xix, 1923 p 639 and Rec Ind Mus xxv, 1923 p 319
Sinotes binotatus Durr & Bib 1834 Lrp Gen vi, p 829
 (Malabar dist. Paria)

Seven sometimes 6 supralabials 3rd and 4th touching the eye, 6th often excluded from the labial border, no loreal, the posterior nasal elongate, sometimes meeting the preocular, 1 anterior temporal Scales in 17 rows V 138-165 not angulate laterally, C 27-38

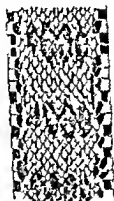


Fig 75 — Dorsal pattern of *Oligodon venustus* (B.M. 23 1.27 44.)

Hemipenis extending to the 9th caudal plate, not forked, the distal $\frac{1}{2}$ is banded, the bands being transversely arranged, they merge into a short proximal spinose area, the spines being relatively coarse and closely set

Greyish brown above with large irregular oval, or rhomboidal, sometimes paired, blackish spots edged with lighter, sides with smaller spots, below yellowish or whitish with large black quadrilateral spots the two colours in nearly equal proportions except under the tail where the yellow predominates, head with the characteristic markings, the outlines of which are more or less crenate

Total length ♂ 490, tail 63 mm

Range Western Ghats south of the Goa Gap Wynad, Nilgiri and Palni Hills Cochin Travancore Not uncommon in the Wynad between 5 000 and 6 000 ft altitude.

147. *Oligodon travancoricus*.

Oligodon travancoricum Beddome, 1877, P.Z.S. p. 685 (S. Travancore Mts.: London).—*Oligodon travancoricus*, Boulenger, F. B. I. 1890, p. 318, and Cat. Sn. Brit. Mus. i, 1890, p. 236, pl. x, fig. 2; Wall, J. Bombay N. H. S. xxiii, 1914, p. 169, and xxiv, 1923, p. 629, and Rec. Ind. Mus. xxv, 1923, p. 316.

Very closely allied to *venustus* with which it agrees in scalation.

Hemipenis the same except that the fionces are edged with numerous small spines.

In coloration it differs in that the large paired spots are narrower and form more or less distinct transverse bars.

Total length: ♂ 450, tail 65 mm.

Range. Western Ghats, South of the Palghat Gap. (High Range, Travancore; Tinnevely Hills.)

148. *Oligodon tæniolatus*.

Russell, i, 1796, pl. 19, p. 24 (Vizagapatam).

Coronella tæniolata Jerdon, 1853, J. A. S. Bengal, xxii, p. 528.—

Oligodon tæniolatus, Wall, Sn. Ceylon, 1921, p. 239, and J. Bombay N. H. S. xxix, 1923, p. 627, and Rec. Ind. Mus. xxv, 1923, p. 311; Prater, J. Bombay N. H. S. xxx, 1924, p. 171; Fraser, *ibid.* xxxix, 1937, p. 481.

Xenodon dubium Jerdon, 1853, J. A. S. Bengal, xxii, p. 528 (North Canara: type lost).

Oligodon subgriseum Dum. & Bibr. 1854, Erp. Gen. vii, p. 59 (Pondicherry: Paris).—*Oligodon subgriseus*, Günther, Rept. Brit. Ind. 1864, p. 207, pl. xix, fig. F; Jan, Icon. Gén. 1876, 48, pl. i, fig. 3; Boulenger, F. B. I. 1890, p. 321, and Cat. Sn. Brit. Mus. ii, 1894, p. 243; Wall, J. Bombay N. H. S. xvi, 1904, p. 298, and xix, 1909, p. 556, pl. —, and xxvi, 1919, p. 568, and Sn. Ceylon, 1921, p. 239, and Rec. Ind. Mus. xxv, 1923, p. 311.

Oligodon spilonotus Günther, 1864, Rept. Brit. Ind. p. 207, pl. xix, fig. E (Madras and Malabar: London).

Oligodon fasciatus Günther, 1864, Rept. Brit. Ind. p. 208, pl. xix, fig. D (Deccan: London).

Oligodon ellioti Gunther, 1864, Rept. Brit. Ind. p. 207, pl. xix, fig. G (Madras: London); Boulenger, F. B. I. 1890, p. 321, and Cat. Sn. Brit. Mus. ii, 1894, p. 242; Wall, J. Bombay N. H. S. xix, 1909, p. 533, and xxix, 1923, p. 627, and Rec. Ind. Mus. xxv, 1923, p. 313.

Oligodon subgriseus alternans Bethancourt-Ferreira, 1897, J. Acad. Sci. Lisbon (2), iv, p. 224 (Goa: Lisbon: not seen by me).

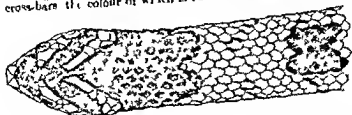
Oligodon tæniolatus var. *ceylonicus* Wall, 1921, Sn. Ceylon, p. 240.

Seven supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 15 rows. V. 158–218, feebly angulate laterally; C. 29–56.

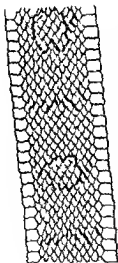
Hemipenis extending to the 11th caudal plate, forked for $\frac{2}{3}$ of its length; proximal to the fork the organ is spinose, the spines being relatively large and increasing in size as they approach the base of the organ; distal to the fork it is smooth with 4 longitudinal folds.

Five colour forms can be defined all completely connected with one another, except Form V.

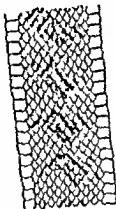
I Light brown to buff above with narrow black transverse cross-bars the colour of which is confined to the edges of the



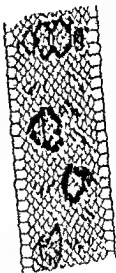
A



B



C



D

Fig 76—*Oligodon sensolatus* A Head of Var I (B.M. 74.4.29.12)
B Dorsal pattern of same C Dorsal pattern of Var II (B.M.
69.8.28.145) and D of Var V

scales and with or without 4 dark brown longitudinal stripes namely 2 broad ones on either side of the vertebral line, and 2 narrower ones on scale rows 2 and 3 a whitish vertebral stripe present or absent yellowish below with or without

lateral spots ; head with the typical markings, but the pattern shows considerable variation. The dorsal colour pattern of this form is like that of *theobaldi*, fig. 74 (*laeniolatus*: *subgriseus*).

The whole of Peninsular India from Sind and Baluchistan in the N.W. to Bengal (Purnea) in the N.E. ; Ceylon.

II. The cross-bars are enlarged to form transverse spots of irregular outline ; they consist usually of a large median spot and two smaller lateral ones ; they may or may not be edged with white (*dubius* : *fasciatus* : *elliott*).

India, south of lat. 20° N. ; Ceylon.

III. The dorsal spots are still larger and longitudinally elongate in shape ; they are edged with dark brown and about twice as long as their interspaces ; there are from 18-22 on the body.

Nilgiri Hills ; Madras district.

IV. With large, transversely placed, dark brown black-edged spots (14-16 on the body) usually indented mesially (*splonotus*).

Western Ghats ; Madras district.

V. With large dark brown rounded spots ; these are edged with black and outside again with white. They may be paired or alternate with one another on opposite sides of the vertebral line (*alternans*).

Travancore ; Malabar ; Ceylon.

Total length : ♂ 450, tail 72 ; ♀ 590, tail 63 mm.

Range. As given under the colour forms.

A hill species but occurring also in the plains ; found frequently in the vicinity of human habitations.

149. *Oligodon arnensis*.

Russell, 1796, Ind. Serp. i, pp. 41 and 43, pls. 35 and 38 (Vizagapatam and Arni, N. Arcot).

Coluber arnensis Shaw, 1802, Gen. Zool. iii, p. 526 (based on Russell's fig. 38).—*Simotes arnensis*, Boulenger, F. B. I. 1890, p. 314, and Cat. Sn. Brit. Mus. ii, 1894, p. 229 ; Abercromby, Sn. Ceylon, 1910, p. 72 ; Wall, J. Bombay N. H. S. xviii, 1907, p. 115, and xix, 1909, p. 532, and xxii, 1914, p. 749, col. pl. xx.—*Oligodon arnensis*, Wall, Sn. Ceylon, 1921, p. 231, and Rec. Ind. Mus. xxv, 1923, p. 324, and J. Bombay N. H. S. xxix, 1923, p. 629 ; Prater, ibid, xxx, 1924, p. 170 ; Fraser, ibid. xxxix, 1937, p. 480.

Coluber russellius Daudin, 1803, Hist. Nat. Rept. vi, p. 395, pl. lxxvi, fig. 2 (based on Russell's fig.).

? *Coluber monticolus* Cantor, 1839, P. Z. S. p. 52 (Nepal : col. sketch in Bodleian Library).

Simotes albiventer Günther, 1864, Rept. Brit. Ind. p. 213 (near Kandy, Ceylon : London).—*Oligodon arnensis albiventer*, Deraniyagala, Ceylon J. Sc., Ser. B, xx, 1936, p. 89.

Seven supralabials, 3rd and 4th touching the eye ; loreal

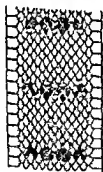
frequently united with the prefrontal, 1 anterior temporal. Scales in 17 rows V 164-202, angulate laterally, C 41-59

Hemipenis extending to the 8th caudal plate, not forked, it is spinose throughout, at the tip the spines are relatively small and placed close together, they gradually increase in size as they near the base of the organ

Light or dark brown above (often reddish or purplish in



A



B



C

Fig 77.—*Ohgodon ornatus* A Head and neck. B Dorsal pattern. (B.M. 57.10.4.42) C Hemipenis
sul., sulcus spermaticus

life) with well-defined black cross bars or transversely arranged spots these narrow on the sides and may break up, they may be edged with white, whitish below, uniform or with indistinct lateral spots head with 3 chevron shaped marks
Total length ♀ 640, tail 100 mm

Range. Ceylon; Peninsular India to Sind, Baluchistan and the N.W.F.P. (Bannu) in the north-west; the Western Himalayas to Nepal and Bengal (Kaliganj, Rangpur district) in the north-east.

Variation. The number of bars upon the body and tail, and their size, varies considerably; the narrowest are not much more than one scale wide, the broadest may occupy as many as 5 scales. This variation can be correlated very roughly with geographical distribution. Wall (1923, p. 324) has attempted it, but his conclusions differ very considerably from mine. I arrange them as follows:—

Ceylon, 13–18 on the body, 3–6 on the tail.

India, S. of lat. 20°, 18–30 on the body, 4–16 on the tail.

India, N. of lat. 20°, 7–20 on the body, 7–20 on the tail.

The loreal is usually present in specimens north of lat. 20°, usually absent in specimens from South of that line and from Ceylon (*arnensis: albiventer*).

Wall has given a good account of this common Indian snake and his colour-plate of it is good. It is found chiefly in the plains, but he states that it is common at Almora at 5,400 ft. It has been found also in other hill districts throughout India at varying altitudes. It is an active, voracious little reptile, easily alarmed and quick to conceal itself. Its habits are chiefly diurnal, and it appears to make its home for the most part in masonry, domiciling itself in bungalows and outhouses. He states that it can inflate its body to a remarkable degree when excited.

150. *Oligodon sublineatus*.

Oligodon sublineatum Dum. & Bibr. 1854, *Erp. Gen.* vii, p. 57 (Ceylon: Paris).—*Oligodon sublineatus*, Jan, *Icon. Gén.* 1876, p. 48, pl. i, fig. 2; Boulenger, *F. B. I.* 1890, p. 320, and *Cat. Sn. Brit. Mus.* ii, 1894, p. 242; Wall, *Sn. Ceylon*, 1921, p. 248, and *J. Bombay N. H. S.* xxix, 1923, p. 627, and *Spol. Zeyl.* xiii, 1924, p. 82, and *Rec. Ind. Mus.* xxv, 1923, p. 314.

Seven supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 15 rows. V. 134–161, not angulate laterally; C. 23–37.

Hemipenis extending to the 14th caudal plate, forked near the tip; it is spinose throughout, the spines being almost uniform in size and regularly arranged.

Brown above, the scales edged with black and white, and with a series of dark brown, more or less rounded spots or narrow cross-bars, which may be paired or alternate with one another; they are best marked on the anterior part of the body; lower parts yellowish with 3 longitudinal series of dark brown spots, the outer series often confluent with one

another the median may be absent head with a dark crescent on the prefrontals passing through the eyes a median elongated spot behind it and a large dark patch on each side of the neck

Total length ♀ 3.0 tail 40 mm

Range Ceylon South Prov (Galle), West Prov (Colombo Matugama Veyangoda) Sabwa Prov (Ratnapura and Yatiyantota districts) Central Prov (Peraleniya)

One of the commonest snakes of Ceylon found chiefly in the low country One individual was obtained in a nest of termites

151 *Oligodon calamarius*

Coluber calamarius Linn., Mus. Ad. Prod. 1754 p. 23 pl. vi, fig. 2, and Syst. Nat. 10th Ed. 1759 p. 218 (America: Stockholm). Anderson, Sv. Vet. Akad. Stockholm, 1893 xxiv 4 6 p. 8

Oligodon templeton Günther 1862, Ann. Mag. Nat. Hist. (3) ix, p. 57 (Ceylon: London) and Rept. Brit. Ind. 1864 p. 209 pl. x x, fig. C. Boulenger F. B. I. 1890 p. 300 and Cat. Fish. Brit. Mus. ii, 1894 p. 241; Wall. Sn. Ceylon, 1901 p. 245 and J. Bombay N. H. S. xx x, 1903 p. 627 and Rec. Ind. Mus. xxv 1903 p. 315

Seven supralabials 3rd and 4th touching the eye 6th usually excluded from the labial border Scales in 15 rows V 17 18 not angulate laterally C 20-34

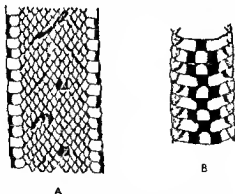


Fig. 78.—*Oligodon calamarius* (B.M. 90.11.8.23)
A Dorsal and B Ventral pattern

Hemipenis extending to the 10th caudal plate not forked it is spinose throughout the spines being closely set and almost uniform in size

Brown above, with a light vertebral stripe and from 18-24 narrow dark brown light edged cross-bars; these may be complete or extend only half-way across the back where they alternate with those of the opposite side; whitish below with square black spots, the two colours being distributed in nearly equal proportions; head markings as in *sublineatus*.

Total length: ♂ 250, tail 38 mm.

Range. Ceylon. South Prov. (Udugama); West Prov. (Hewissa, Matugama); Sab'wa Prov. (Ratnapura, Balangoda); Cent. Prov. (Peradeniya).

A low country species ascending to 3,000 or 4,000 ft. altitude.

152. *Oligodon erythrorhachis*.

Oligodon erythrorhachis Wall, 1910, J. Bombay N. H. S. xix. p. 923, pl. — (Namsang, Jaipur dist., Assam: London), and xxix, 1923, p. 626, and Rec. Ind. Mus. xxv, 1923, p. 309.

No loreal; 7 supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 15 rows. V. 154, not angulate laterally; C. 46.

Brown above with a light (red in life) vertebral stripe, and with 29 narrow, black, light-edged cross-bars on the body and 7 on the tail; yellowish below with squarish black spots at the outer margins of the ventrals and subcaudals; head with the typical markings, namely, a chevron across the prefrontals passing through the eyes, a broad oblique temporal stripe, and a narrow chevron on the nape extending forwards to the prefrontal shields.

Total length: ♀ 375, tail 62 mm.

Range. Known only from the type-specimen.

153. *Oligodon melaneus*.

Oligodon melaneus Wall, 1909, J. Bombay N. H. S. xix, p. 349, pl. — (Tindharia, Darjeeling dist.: London and Bombay), and ibid. xxix, 1923, p. 628, and Rec. Ind. Mus. xxv, 1923, p. 316.

Seven supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 15 rows. V. 152-160, not angulate laterally; C. 39-40.

Hemipenis extending to the 15th caudal plate, not forked; it is spinose throughout, the spines being of almost uniform size.

Blackish-brown above, the scales finely speckled with lighter, and with an indistinct series of distant black vertebral spots; dark plumbeous below, the lower surface of the head whitish.

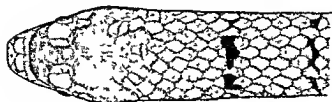
Total length: ♂ 330, tail 55; ♀ 300, tail 45 mm.

Known from two specimens.

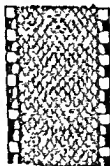
154 *Oligodon affinis*

Oligodon affinis Günther, 1862 Ann. Mag. Nat. Hist. (3) ix, p. 58 (Anamallays London), and Rept. Brit. Ind. 1864, p. 209, pl. xix, fig. B. Boulenger, F. B. I. 1890, p. 318 and Cat. Sn. Brit. Mus. ii, 1894, p. 236, Wall. J. Bombay N. H. S. xxvi, 1919, p. 658 and xxix 1923, p. 630, and Rec. Ind. Mus. xv, 1923, p. 323.

Seven supralabials, 3rd and 4th touching the eye, no loreal, the posterior nasal elongate and often touching the



A



B

Fig 79—*Oligodon affinis* (B.M. 74.4.29.10)
A Head B Dorsal pattern.

preocular, 1 anterior temporal. Scales in 17 rows V. 129-142, not angulate laterally, C 23-36.

Hemipenis extending to the 12th caudal plate, not forked, the distal part of the organ has 4 longitudinal folds, two on each side of the sulcus, the outer pair is segmented and bears minute spines, external to the folds there are fimbriae also with minute spines, the proximal part of the organ is entirely spinose.

Brown above with an indistinct reticulation of darker markings and narrow dark brown cross-bars (31 to 41 in number) often edged with lighter; on the tail they are indistinct or absent; whitish below with squarish black spots, the two colours being almost equally distributed; head markings as in the figure.

Total length: ♂ 340, tail 50 mm.

Range. Western Ghats, south of the Goa Gap. (Wynaad to Travancore.)

155 *Oligodon brevicauda*.

Oligodon brevicauda Gunther, 1862, Ann. Mag. Nat. Hist. (3) ix, p. 58 (Anamallays: London), and Rept. Brit. Ind. 1864, p. 211, pl. xiv, fig. A; Boulenger, F. B. I. 1890, p. 319, and Cat. Sn. Brit. Mus. ii, 1894, p. 240; Wall, J. Bombay N. H. S. xxix, 1923, p. 628, and Rec. Ind. Mus. xxv, 1923, p. 311.

Rostral in contact with and partly separating the pre-frontals; no internasals; no loreal, the posterior nasal

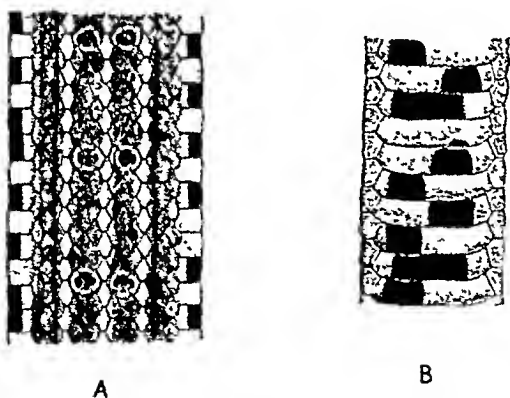


Fig. 80.—*Oligodon brevicauda*. (B.M. 61.12.30.84.)

A. Dorsal and B. Ventral pattern.

touching the preocular; 7 supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 15 rows. V. 158-173, not angulate laterally; C. 25-29.

Hemipenis not known.

Brown above with a light vertebral stripe, bordered on each side by a dark brown or black stripe involving 2 scale-rows; these stripes may or may not be marked with paired series of spots or short bars on the anterior part of the body; a narrow dark lateral stripe on each side of scale row 3; brownish or whitish below (red in life) with large quadrangular or transverse black spots; head with a crescentic band in front, an oblique

temporal stripe and a large dark nuchal patch usually connecting by a longitudinal stripe with the prefrontal mark

Total length ♀ 500 tail 55 mm

Range Western Ghats south of the Goa Gap (Nilgiri Anaimalai and Travancore Hills)

156 *Oligodon erythrogaster*

Oligodon erythrogaster Boulenger 1907 Rec Ind Mus. i, p 218 (Nagarkot Nepal 6000 feet: London) Wall J Bombay N H S xix 1910 p 1000 fig. and xx 1913 p 639 and xxix 1923 p 629 and Rec Ind Mus xxv 1923 p 321; Shaw & Shebheare J Darjeeling N H S iv 1929 p 28 Shaw & others ibid. xiv 1940 p 141

No loreal the prefrontal in contact with the 2nd labial 7 supralabials 3rd and 4th touching the eye 6th not reaching the labial border in the position of a lower anterior temporal Scales in 17 rows V 178-186 (163 Wall) not angulate laterally C 42-59

Hemipenrus extending to the 29th caudal plate not forked at the extreme base there is a short area with thick smooth longitudinal folds the remainder has prominent flounces transversely arranged they are finest at the tip

Purplish grey above the scales edged with black a light brown vertebral stripe bordered on either side by a greyish brown one of equal width these two stripes being edged with black another stripe similarly coloured on scale rows 3 and 4 3 other narrower black stripes 1 above it and 2 below whitish below (red in life) the outer margins of the ventrals and subcaudals with black apots more or less confluent with one another head as in *hamptoni*

Total length ♀ 450 tail 75 mm

Range Eastern Himalayas Nagarkote Nepal Tindharia Darjeeling district Known only from a few specimens

157 *Oligodon catenata*

Calamaria catenata Blyth, 1854 J A S Bengal xxiii, p 287 (Assam type lost) Schlater ibid. lx, 1851 p 233 Boulenger F B I 1890 p 282—*Oligodon catenata* Smith Rec Ind Mus xi, 1940 p 481

Oligodon herberti Boulenger 1905 J Bombay N H S xvi, p 231 pl. — (Mogoke Burma London) Wall ibid xxviii 1911 p 44 and xxx, 1923 pp 487 6-6 and xxx 1915 p 813 and Rec Ind Mus xxv 1923 p 308 Werner Stz Ber Akad Wiss Wien, cxxxix 1924 p 37 (Cambodia) Martens Bull Antiven. Inst i 1929 p 41 Angel Bull Mus Hist Nat Paris, (2) i 1919 p 79 Bourret Serp Indo China, 1936 p 252 and Bull Gen Instr Pub Hanoi Feb 1939 p 27 *Oligodon herberti* var *clerkiana* Pellegrin, 1910 Bull Soc. Zool Fr xxxv p 30 (Tam-dao Tong King Paris) Bourret l c s 1939

No internasals the rostral in contact with and just separating

the anterior end of the prefrontals which are very large; no loreal, the prefrontal in contact with the second labial; 6 supralabials, 3rd and 4th touching the eye; 1 anterior temporal. Scales in 13 rows. V. ♂ 186-196, ♀ 179-212, not angulate laterally; C. 34-43.

Hemipenis extending to the 7th caudal plate, not forked; it has numerous longitudinal folds which bear small spines; proximally there is a small area which is entirely spinose.

Two colour forms.

I. Purplish-grey or brown above, with four dark brown longitudinal stripes, the median pair separated by a yellowish-brown vertebral stripe, the outer pair on scale rows 2 and 3; yellowish below (red in life), almost every other ventral shield with a black square spot at the outer end; tail almost immaculate; head markings as in *hamptoni* (*herberti*).

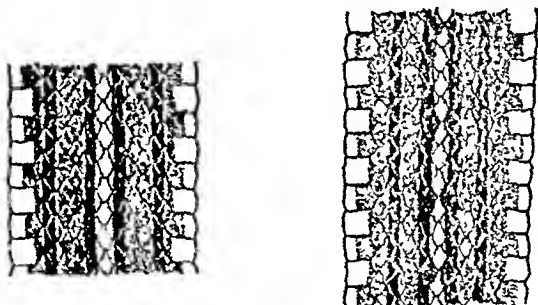


Fig. 81.—Dorsal patterns of *Oligodon catenata*.

A. Var. I. B. Var. II.

II. Like I, but the vertebral stripe formed by a concatenation of lozenge-shaped or sausage-shaped, black-edged spots, which may fuse with one another and form an irregular stripe (*catenata*: *eberhardti*).

Total length: ♂ 565, tail 75; ♀ 540, tail 68 mm.

A larger female measures 580 mm. in total length, tail incomplete.

Range. Burma (Mogok, Bhamo, Kachin Hills; Nam Tamai Valley near the Tibetan border); Tong-King; Southern China; Cambodia (*vide* Werner).

Form I is found chiefly in Burma, but Bourret, 1939, records it from Tong-King. All the specimens that I have seen from Tong-King belong to Form II. In Upper Burma, north of the Triangle, and in the Bhamo district both forms occur; some individuals combine both patterns, having I on the fore-part of the body, II on the hinder part, or vice versa.

I have not seen Werner's specimen said to have come from Cambodia. Its description agrees with that of Form II. (V. 165.)

Blyth's description of *catenata* agrees so completely with this species that I have no hesitation in applying his name to it.

158 *Oligodon medongalli*

Oligodon medongalli Wall, 1903 J. Bombay N. H. S. xvi, p. 231, fig. (Sandoway [not Sandarang] Burma type lost) and xxix, 1923 p. 626 and Rec. Ind. Mus. xxv, 1923 p. 308.

No loreal, the prefrontal in contact with the 2nd labial, 7 supralabials. 3rd and 4th touching the eye. Scales in 13 rows. V 200 not angulate laterally, C 39.

Dusky black with a reddish brown vertebral stripe from nape to tip of tail, it is edged with small black spots most evident anteriorly, a black line on scale rows 2 and 3, ending at the vent. tail with 2 black bars, one at the base the other near the tip, head blackish with yellow markings on the snout and lips, nape with an incomplete collar, black below mottled with fawn.

The type and only known specimen cannot now be found. The above description is compiled from Wall's original account.

159 *Oligodon dorsalis*

Elops dorsalis Gray & Hardwick, 1834, Ill. Ind. Zool. ii, pl. lxxxv, fig. 1 (Chittagong London).—*Oligodon dorsalis*, Gunther Cat. Sn. Brit. Mus. 1858 p. 22, and Rept. Brit. Ind. 1864 p. 210. Anderson, P. Z. S. 1871 p. 163, Boulenger, F. B. I. 1890 p. 319 and Cat. Sn. Brit. Mus. ii, 1894 p. 241, Wall, J. Bombay N. H. S. xviii, 1908, p. 827, fig. and xxix, 1923, p. 627 and Rec. Ind. Mus. xxv, 1923, p. 310, Vennings, J. Bombay N. H. S. xx, 1910 p. 338, and 1911, p. 772. Smith, Rec. Ind. Mus. xlii, 1940 p. 482.

Seven supralabials, 3rd and 4th touching the eye, 1 anterior temporal. Scales in 15 rows. V 162-188, not angulate laterally. C 27-51.

Hemipenis extending to the 20th caudal plate, forked at the 14th, the greater part of the organ has strongly developed flounces obliquely arranged, at the base are a few large spines.

Dark brown to purplish above with a light vertebral stripe edged with black or with black spots, another black stripe occupies scale rows 2 and 3, lower parts black and yellow, the black predominating on the belly the yellow on the tail; head dark brown with indications of the typical markings; tail with 2 or 3 large black spots above, the first on the base, the others near the tip, below orange in life.

Total length : ♂ 415, tail 80 mm.

Range. Assam (Garo, Naga and Khasi Hills) : Bengal (Chittagong Hills) : Burma, (N'Changyang in the Triangle, Chin Hills, Mansi, Katha district).

160. *Oligodon hamptoni*.

Oligodon hamptoni Boulenger, 1918, P. Z. S. p. 9, fig. (Mogok, Burma : London) ; Wall, J. Bombay N. H. S. xxx, 1925, p. 814.

No internasals, the rostral in contact with, and partly separating, the prefrontals ; loreal very small or absent ; 5

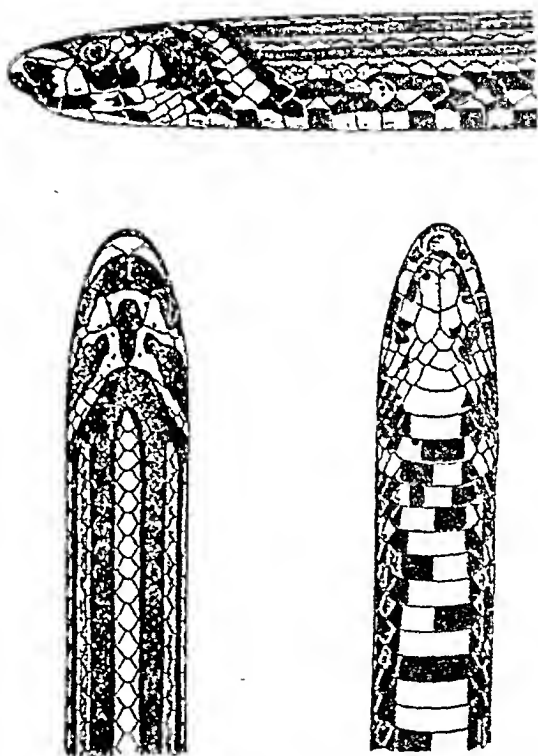


Fig. 82.—*Oligodon hamptoni*. (After Boulenger, P. Z. S. 1918.)

supralabials, 2nd and 3rd touching the eye ; 1 anterior temporal. Scales in 15 rows. V. 160–175, angulate laterally ; C. 30–32.

Hemipenis extending to the 11th caudal plate, not forked ; the distal half is flounced, the folds being partly connected to

form large calyces, the lips of which have small spines; the proximal area is spinose, the spines being comparatively stout and of almost uniform size throughout.

A broad yellow vertebral stripe, from the nape to the end of the tail, between a pair of reddish-brown, black-edged dorsal stripes of about the same width; sides bluish grey, with two narrower dark brown stripes, the lower interrupted; head dark brown, with yellowish, crescentic markings as in the figure, namely, one across the snout, another on the top of the head, and two oblique ones behind which are interrupted on the mid line, belly red, with black bars occupying a whole ventral shield or interrupted and alternating; lower surface of tail uniform red.

Total length ♂ 390, tail 75 mm.

Range Upper Burma Mogok (Ruby Mines); Simlangaba (Bhamo district).

161 *Oligodon lacroixi*.

Oligodon lacroixi Engel & Bourret, 1933, Bull. Soc. Zool. Fr. (viii), p. 134 (Chapa, Tong King, Paris); Bourret, *Serp. Indochine*, 1936, p. 254, fig. head.

Like *hamptoni* in general scalation. Loral always absent. V 162-178, not angulate laterally, C. 25+ to 33+, a good deal of the tail missing in the two examples examined by me.

Dark purplish brown above, with a vertebral series of light (orange in life) rounded or transversely oval, black-edged spots, 11 or 12 + 2 or 3 in number, and with 4 indistinct, blackish, longitudinal stripes, the median pair bordering the vertebral series of scales, the outer on scale row 3, each vertebral spot occupies one scale and the adjacent edges of those that surround it, coral red below with black bars as in *hamptoni*, head brown above, with light (1 red or pink) markings, namely, one covering the snout, a wide-angled A shaped mark across the head behind the eyes and another and much narrower one behind it.

Total length ♀ 700, tail 80 mm, incomplete.

Known only from the type locality.

Genus CALAMARIA.

Calamarius Bonap., 1826, *Icon. p. 891* and 1827, pp. 519-539 (type *lamarci*) Boulenger, P. B. I. 1890, p. 281, and Cat. Sn. Brit. Mus. II, 1894, p. 230.
Changulius Gray, 1833, *Ill. Ind. Zool.* u. pl. 86, fig. 3 (type *albiventer*) Merriam & Benckeb., xi. 12, 1929, p. 20.
Typicalamarius Günther, 1872, P. Z. S. p. 595 (type *gracillima*).

Maxillary teeth 8-11, equal, strongly curved. Head not, or scarcely, distinct from neck, eye moderate, with round

pupil; nostril pierced in a very small nasal; no loreal; no internasals; no temporals, the parietals in contact with the labials; preocular present or absent. Body cylindrical; scales smooth, in 13 rows throughout, without apical pits; ventrals rounded; tail short, subcaudals paired.

A Malayan genus of some 60 or 70 species, three of which extend their range into the Indo-Chinese region.

Small snakes of gentle disposition, usually found concealed under stones or fallen trees.

By Opinion 92, Oct. 1926 (Intern. Commission, Zoological Nomenclature), the generic name *Calamaria* was standardised, with *Coluber calamarius* Linn. as type. Andersson, however, in 1899 (Bihang Sv. Vet. Akad. xxiv (4), p. 8) has shown that the *Coluber calamarius* of Linnæus is an entirely different

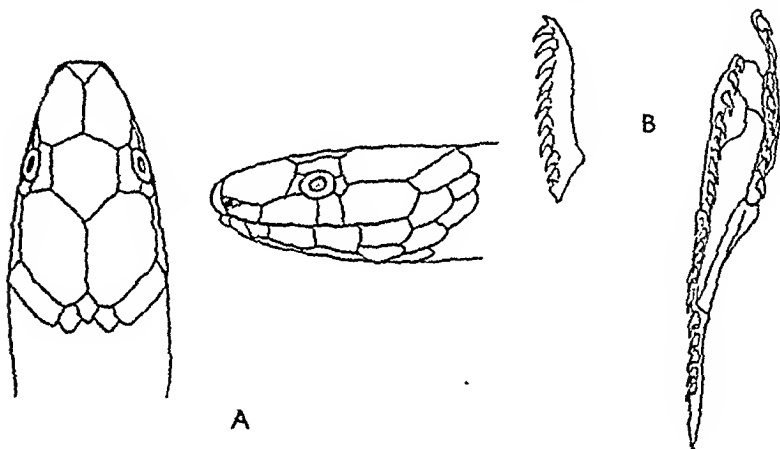


Fig. 83.—A. Head of *Calamaria pavimentata*. (After Boulenger, F. B. I. 1890.) B. Maxilla and palato-maxillary arch of *C. uniformis*.

snake, namely, *Oligodon templetoni*, a species peculiar to Ceylon. An examination of Boie's paper shows that the snake which he made the type of his genus was an undoubted *Calamaria*, which he believed conspecific with the Linnean species, and he (presumably) renamed it *Calamaria linnæi* to avoid tautonymy. The type of *Calamaria* therefore is *C. linnæi*, the snake Boie had before him, and not the Linnean species, with which he thought it identical.

Key to the Species.

1. Frontal longer than broad; tail ending in a point.

Subcaudals ♂ 19–25; ♀ 10–14 *pavimentata*, p. 238.

Subcaudals ♂ 30–34; ♀ 18–19 *uniformis*, p. 238.

2. Frontal as long as broad; tail blunt..... *septentrionalis*, p. 239.

162 *Calamaria pavimentata*.

Calamaria pavimentata Dum. & Bib 1854, Erp. Gen. vii, p. 71 (Java Paris); Jan, Icon Gén Ophid., Liv. 10, pl. 1, fig. 9, Boulenger, F. B. I. 1890, p. 282, and Cat. Sn. Brit. Mus. ii, 1894, p. 243; Prater J. Bombay N. H. S. xxvi, 1919, p. 684; Wall, ibid. xxix, 1924, p. 865; Pope, Rept. China, 1935, p. 305; Angel Bull. Mus. Hist. Nat. Paris (2) i, 1929, p. 76.

Calamaria quadrimaculata Dum. & Bib 1854, Erp. Gen. vii, p. 73 (Java Paris).

Calamaria annamensis Günther, 1864, Rept. Brit. Ind. p. 196. (S. Laos French Indo-China London).

Calamaria pavimentata banaensis Bourret, 1934, Bull. Gen. Inst. Pub. Hanoi, May, p. 174, and Serp. Indo-China, 1936, p. 272 (Bana, Annam Paris).

Calamaria pavimentata annamensis Bourret, 1937, Bull. Gen. Inst. Pub. Hanoi, May, p. 32 (Dong Tam-vo, Quang Tri Prov. Paris).

Rostral much broader than high, well visible from above, the portion visible $\frac{1}{2}$ – $\frac{2}{3}$ as long as the interprefrontal suture; frontal longer than broad, as long as, or longer than, its distance from the end of the snout, about twice as broad as the supraoculars, 1 pre and 1 postocular, 4 supralabials, 2nd and 4th largest, 2nd and 3rd touching the eye, anterior genials longer than the posterior. V 152–186 (196 in the type of *C. p. annamensis*), C ♂ 10–25, ♀ 10–14, A 1; tail tapering to a point.

Hemipenis extending to the 7th or 8th caudal plate, deeply forked and devoid of spines, it is smooth proximal to the point of forking but calyculate beyond; the calyces are pocket-like in shape and uniform in size; the edges are not scalloped, a broad longitudinal fold extends from the point of forking to the tip of the organ, the lips of the sulcus are smooth and moderately prominent (Pope).

Reddish brown above, with dark longitudinal lines or series of spots, a broad dark bar on the nape edged behind, and usually also in front, with yellow, belly uniform yellow, or the ventrals edged with brown, two yellow spots at the base of the tail and two near the tip, in *C. p. banaensis* there is a dark median line along the belly and tail. The above description applies to specimens from the Indo-Chinese region.

Total length ♂ 320, tail 15 mm.

Range Widely distributed throughout the Indo-Chinese region, but nowhere common, extending in the north-west as far as the Tura and Chin Hills in Assam, Southern China, the Malay Peninsula, Java. Found in hilly country.

163 *Calamaria uniformis*.

Calamaria pavimentata var. *uniformis* Smith, 1921, P. Z. S. p. 428 (Langbian Peaks, S. Annam, 6,000 feet London).

Like *pavimentata* but differing in the higher caudal count,

the hemipenis and coloration. V. ♂ 143-149, ♀ 166-167; C. ♂ 30-34, ♀ 18-19 (10 examples).

Hemipenis forked near the extreme tip, and without the longitudinal folds, but otherwise as in *pavimentata*.

Uniform dark brown above, yellow below, the ventrals with or without dark brown spots mesially arranged; a median series underneath the tail always present.

Total length: ♂ 315, tail 34; ♀ 350, tail 30 mm.

Range. Known only from the type locality.

164. *Calamaria septentrionalis*.

Calamaria septentrionalis Boulenger, 1890, P. Z. S. p. 34 (Kiokiang and Hong-kong: London), and Cat. Sn. Brit. Mus. ii, 1894, p. 349; Parker, Ann. Mag. Nat. Hist. (9) xv, 1925, p. 25; Pope, Rept. China, 1935, p. 306, pl. xii, figs. K-P; Bourret, Serp. Indo-Chine, 1936, p. 272.

Snout shorter and more broadly rounded than in *pavimentata*; rostral only just visible from above; frontal as broad as long, not longer than its distance from the end of the snout; tail blunt. V. 162-176; C. ♂ 15-18, ♀ 8-10; A. 1 (for specimens from the Indo-Chinese region).

Hemipenis as in *pavimentata*.

Blackish-brown above, with three longitudinal series of small black spots; each scale of the outer row with a whitish spot; a yellow nuchal collar interrupted in the middle, and a pair of yellow spots at the base of the tail; lower parts uniform coral-red, with a black line along the middle of the tail.

Total length: 320, tail 15 mm.

Range. Tong-King (Thai-Mien; Cao-Bang); Hong Kong; Southern China.

Genus AHÆTULLA.

BRONZE BACKS

Ahetulla Link, 1807, Besch. Nat. Samml. Rostock, p. 73 (type *fasciata*=*Coluber ahetulla* Linn.; in part).

Dendrophis Fitzinger, 1826, Neue Class. Rept. pp. 29, 30, and Isis, 1827, p. 519 (type *Coluber ahetulla* Linn., and in Syst. Rept., 1843, p. 27, *picta* Boie); Boulenger, F. B. I. 1890, p. 296, and Cat. Sn. Brit. Mus. ii, 1894, p. 77; Wall, Rec. Ind. Mus. xxii, 1921, p. 151, and J. Bombay N. H. S. xxix, 1923, p. 623; Meise & Hennig, Zool. Anz. Leipzig, xcix, 1932, p. 273, and cix, 1935, p. 138; Stejneger, Copeia, 1933, p. 202; Mertens, Arch. Naturg. Leipzig, n.f. iii, 1934, p. 187.

Dendrelaphis Boulenger, 1890, F. B. I. p. 339 (type *caudolineatus*), and Cat. Sn. Brit. Mus. ii, 1894, p. 87; Mertens, Arch. Naturg. Leipzig, iii, (2) 1934, p. 187; Wall, Rec. Ind. Mus. xxii, 1921, p. 151.

Tachyophis (non Rochebrune 1884) Mertens, 1934, Arch. Naturg. Berlin, iii, (2) p. 189 (type *Coluber pictus*).

Maxillary teeth 20 to 34, the posterior 3 or 4 slightly larger or slightly smaller than the others; head distinct from neck;

eye large with round pupil; loreal region more or less concave. Body elongate, scales smooth, in 13 or 15 rows, all except the outer row narrow, with single apical pits, disposed obliquely, the vertebrals more or less enlarged; ventrals with a suture-like lateral keel and a notch on each side, corresponding to the keel, tail long, subcaudals paired, keeled like the ventrals. Hypapophyses absent on the posterior dorsal vertebra, represented by a low keel.

Common characters, unless otherwise stated.—Nostril between two nasals. rostral broader than high; frontal more or less bell shaped, as long as, or a little longer than, its distance from the end of the snout, loreal elongate, twice as long as high, 1 pre and 2 postoculars, anterior pair of genials shorter than the posterior, vertebral scales enlarged, originating on the neck by the fusion of two scales.

Range The Oriental Region to Australia.

With the exception of *grandoculis* and *caudolineolatus* all the Oriental species have a colour character in common. The interstitial skin is black or blackish, this colour extending on



Fig 84.—*Ahaetulla ahaetulla* Maxilla and mandible

to the margins of the dorsal scales, except those of the outer row, in addition the outer margin of each scale, or alternate scale, has a light blue spot. These markings are most evident on the anterior half of the body, and can be seen only when the body is inflated. The black edging to the scales is variable in amount, and in some species can be seen at all times.

The epitracheal scales are easily rubbed off in preserved specimens, the scales then being of a bluish green coloration. This alteration of the colour has led to occasional inaccuracies in description.

The Bronze Backs are a genus of arboreal snakes, many of them of strikingly beautiful coloration. They live entirely among bushes and on trees, only descending to the ground to search for food. In their native haunts they can move with amazing rapidity. Their prey, which they hunt by day, consists chiefly of frogs and lizards, but they have been known to eat toads and sometimes insects. That they can "fly" or plane as can *Chrysopelea ornata*, has not yet been definitely established. From 3 to 6 elongated eggs are laid at a time, development of the young may have commenced before deposition.

Meise & Hennig (1932) have recently reviewed the genus, reducing the number of species in it to eight, with numerous subspecies. After comparing their opinions with the Oriental material at my disposal, I find myself unable to agree with them on many points. The affinities of the species must, I believe, be sought for in the comparative enlargement of the vertebral scales rather than in the teeth; the difficulty of adequately expressing that enlargement in measurable terms, prevents its use as a major key character.

The genus is undoubtedly one of the most difficult of all the Oriental groups. Boulenger (1896), Wall (1921), Meise & Hennig (1932) and Mertens (1933) have in turn revised it, and in turn have disagreed with one another, particularly with regard to the status of the forms related to *ahætulla*.

The *Coluber ahætulla* of Linnæus, as shown by Andersson (1899), is a composite of two species, namely, *Dendrophis pictus* (Asiatic) and *Leptophis liocercus* (S. American), *sensu* Boulenger. Lacépède, in 1789, tied the name *ahætulla* to the Asiatic specimen. He did not name his "Le Boiga" *Coluber boiga* as is generally stated, but *Coluber ahætulla*. This is clearly shewn in the synonymy of Le Boiga on p. 223 and in his Index on p. 507, col. 1. The name Le Boiga, as with the name La Sombre which follows it on p. 229 and many others, was used in a trivial sense. There is in consequence no such name as *Coluber boiga* Lacépède. Link in 1807 removed *Coluber ahætulla* from the genus *Coluber* of Linnæus and, including with it *C. mycterizans*, made a new genus which he called *Ahætulla*. To avoid tautonymy he renamed the *ahætulla* of Linnæus *fasciata*. In raising the Linnæan specific name to generic rank, he was following the usual practice of his time, and that such was his intention is clearly shown in his definition of the genus. His reference to the *boiga* of Lacépède shows also that he had in mind the Asiatic snake and not the South American one. *Ahætulla fasciata*, therefore, the *Dendrophis pictus* of Boie, based on the *Coluber ahætulla* (in part) of Linnæus, becomes type of the genus *Ahætulla* by absolute tautonymy (Art. 30, d).

Key to the Species.

I. Last 3 or 4 maxillary teeth larger—
stouter and usually longer—than the
others.

A. Scales in 15 rows.

a. Vertebral scales not strongly en-
larged, not broader at mid-body
than the scales of the outer row.

Diameter of the eye not more than its distance
from the nostril; a black temporal stripe *ahætulla*, p. 242.

- Diameter of the eye more than its distance from the nostril, no black temporal stripe
 b Vertebral scales strongly enlarged, broader at mid body than the scales of the outer row
grandoculis, p 245
- A single loreal, V 186-211 no black flank stripe
cyanochloris, p 244
- Two loreals, V 184-176
bifrenalis, p 245
- B Scales in 13 rows
 Vertebral scales not strongly enlarged, the posterior margin rounded T 1+2
caudolineolata, p 247
- Vertebral scales strongly enlarged, the posterior margin truncate, T 1+1
gorri, p 246
- II Posterior maxillary teeth shorter than the others
 A. Scales in 15 rows
 Two labials touching the eye
tristis, p 248
- One long labial touching the eye
subocularis, p 249
- B Scales in 13 rows
 Dorsum with black longitudinal lines
[caudolineolata] p 250

165 *Ahaetulla ahaetulla*

PAINTED BRONZE BACK

- Coluber ahaetulla* Linn. 1758 Syst Nat Ed. 10 p 225 (in part),
Lacophis Hist Nat Serp u 1789 (i) pp 103 (ii) 253 & 507
 Anderson, Kungl Sven. Vet Akad Stockholm, xxiv, 1899
 (4) 6 p 22
- Coluber pictus* Gmelin, 1783, Syst Nat 1, p 1116 (no type loc. given) — *Dendrophis pictus* Boie Ins, 1827, p 630 (Java),
 Boulenger F B I 1890 p 337 and Cat. Sn. Brit Mus ii, 1894 p 78 (in part) Wall J Bombay N H S xviii, 1907, p 189 and xix, 1909 10 pp 347, 788 and xxv, 1918, p 509, and Rev. Int. Mus xxii, 1921, p 153, Smith, J Nat Hist Soc Sum i, 1914 p 86, Shaw & others, J Bengal N H S xiv, 1940 p 108
- Ahaetulla fasciata* Link, 1897 Beuche Nat Samml Rostock, p 74 (Based on *Berhsteia*, Nat Amph iii, 1891, p 425)
- Coluber decorus* Shaw, 1802 Gen Zool iii, p 538 (type loc. unknown London)
- Ahaetulla bellus* Hard & Gray, 1834 Ill Ind Zool ii, pl 80 fig 2 (Singapore)
- Dendrophis picta* var. *andamanensis* Anderson, 1871 P Z S p 184 (Andamans Calcutta)
- Dendrophis proarchus* Wall, 1909 J Bombay N H S xix, pp 347 and 1910 p 827, fig (Dibrugarh Assam London)
- Ahaetulla banga* Lochran, 1930 Proc U S Nat Mus lxxvii (11), p 26 — *Dendrophis banga* Poyu Rept China, 1935 p 279
- Dendrophis pictus nigrescens* Bourret 1935 Bull Gen Instr Pub Hanoi May p 4 (Ngan son, Tong King Paris) and Serp Indo-Chino 1936 ii, p 221 (not seen by me)

Maxillary teeth 23 to 29, posterior largest, snout broadly rounded, eye as long as its distance from the nostril, inter nasals usually a little shorter than the prefrontals; temporals 1+2 or 2+2, rarely 1+1, 9, rarely 8, supralabials, 4th just touching, 5th and 6th below the eye, vertebral scales enlarged, variable in breadth, at mid body not broader than the outer

row of scales, the posterior margin obtusely pointed or rounded, or truncate, rarely concave. Scales in 15:15:11 or 9 rows. V. 167-200; C. 127-164; A. 1 or 2.

Hemipenis undivided, very long, extending to the 24th caudal plate; it is longitudinally plicate, the folds being provided with minute spines except at the extreme base where there are a few larger and coarser ones; sulcus lips very

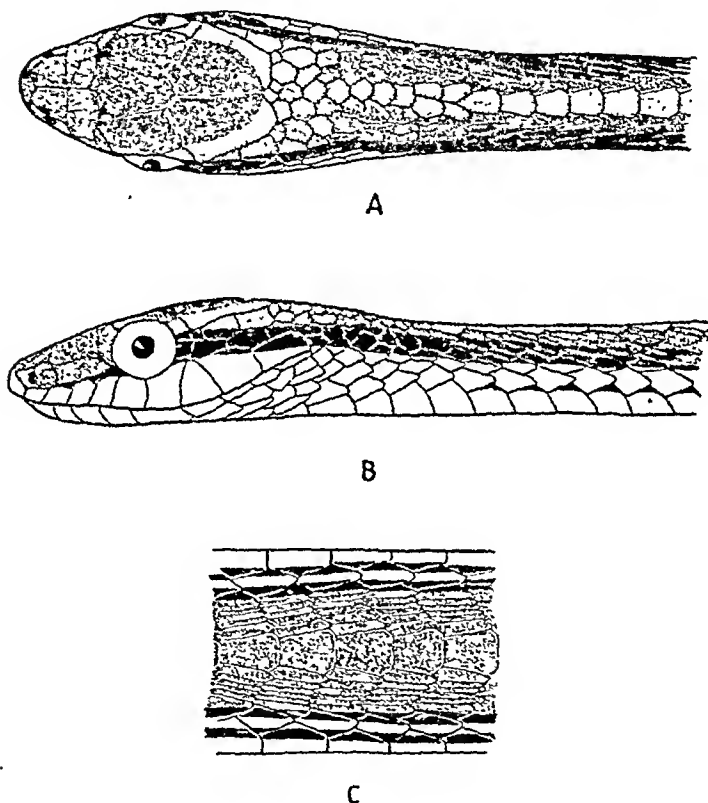


Fig. 85.—*Ahætulla ahætulla*.

A. Dorsal. B. Lateral, view of head. C. Dorsal pattern.

prominent; at about the middle of the organ and extending half-way across it are two transverse folds.

Two races, the typical one with two colour forms.

I. *Ahætulla a. ahætulla*.

1. Bronze-brown above; a yellow or cream-coloured flank stripe along scale-rows 1 and 2, bordered below by a dark, usually black, stripe, almost as broad, and with or without

a narrower one above lower parts creamy white or yellowish, or greenish or bluish a black stripe along the side of the head, strong on the temple and passing on to the neck, where it breaks up into oblique bars, upper lip and lower jaw yellow or white

Total length ♂ 1100 tail 365, ♀ 1220 tail 400 mm

Range The whole of the Indo Chinese region from Bengal and the Eastern Himalayas to southern China Common in many places both in the hills and in the plains Its occurrence in the Indian Peninsula is open to doubt (See Wall, 1910 and 1923)

2 Like the typical form but with the markings reduced, the yellow flank stripe absent or merely indicated and the black one reduced to spots edging the scales.

Range Southern India

II *Ahaetulla a. andamanensis*

Bronzy olive or greenish sometimes reddish, above all the dorsals and the outer margins of the ventrals heavily edged with black lower parts greenish yellow, a black stripe along the side of the head passing on to the neck. A very distinct form possibly a race of the Malayan *formosa* and not of *ahaetulla*

Range The Andamans

Except that it has the anal undivided I cannot find any character by which to distinguish Wall's *procerus* from *ahaetulla* as an occasional aberration an undivided anal occurs also in *tricus porus* and *cyanochloris*

The Painted Bronze back is fairly common throughout the greater part of the Indo-Chinese region inhabiting the plains and hilly districts at low altitudes. I found it one of the commonest snakes in the neighbourhood of Bangkok, frequenting the low brushwood in the fields the plantations and the compounds in the town, loving the sunshine and on the move at all hours of the day In dull weather it was less active Curiously enough for a creature of such marked arboreal habits its diet seemed to consist entirely of frogs mainly the common species of the rice fields. I never found anything else in the stomachs of those I examined and when in captivity they lived entirely upon them refusing all other kinds of food In disposition they were shy and always resented being handled.

166 *Ahaetulla cyanochloris*

- Dendrophis pictus* var *cyanochloris* Wall, 1921 Rec Ind Mus. xxii, p. 155 (Mergu, Tenasserim London)
Ahaetulla cyanochloris, Smith, Rec Ind. Mus. xi: 1940 p. 482.
Dendrophis pictus, Boulenger F B L. And Cat. (in part)
Ahaetulla formosa, Smith, Bull Raffles Mus. No. 3, 1930, p. 52 (in part).

Maxillary teeth 21 to 24, posterior largest; snout broader and squarer than in *ahætulla*; eye as long as its distance from the middle, or the anterior border, of the nostril; internasals as long as, or a little longer than, the prefrontals; temporals 1+2 or 2+2; 9, rarely 8 or 10, supralabials, 4th just touching, 5th and 6th below the eye; vertebrals strongly enlarged, at mid-body broader than the outer row of scales, the posterior margin truncate or concave. Scales in 15:15:11 or 9 rows. V. 186-211; C. 135-159; A. 2.

Hemipenis undivided, very long, extending to the 21st caudal plate; it is longitudinally plicate, the folds being linked to each other at regular intervals so as to enclose diamond-shaped spaces (calyces); they are provided with minute spines; the basal portion of the organ is sharply marked off from the calyculate area by an oblique fold of tissue and has only large coarse spines.

Bronzy-olive above, the scales black-edged; ventrals and outer scales-rows pale greenish or yellowish; usually no black flank stripe; a broad black temporal stripe, extending on to the neck and forebody, where it may be broken up into spots; lips and lower jaw yellowish.

Total length: ♀ 1330, tail 405 mm.

Range. Bengal (Darjeeling district); Assam north to the Thandaung Hills; Upper Burma (Htingnan in the Triangle); Tenasserim; Siam in the north-west; the Andaman and Nicobar Islands.

A. cyanochloris was described by Wall as a colour variety of *ahætulla*, the distribution of the two forms in Indo-China being almost the same. On the characters set forth in the Key, I have regarded it as a species. There is, however, considerable variation in the degree of enlargement of the vertebral scales, and the coloration is not quite constant. More material may prove *ahætulla* to be a very variable species, and Wall's opinion the correct one.

Another near relative of *cyanochloris* is the Malayan *formosa* to which it bears a strong resemblance. Typical *formosa* from the Malay Peninsula as far north as lat. 9°, has, however, 30 to 34 maxillary teeth.

167. *Ahætulla grandoculis*.

Dendrophis grandoculis Boulenger, 1890, F. B. I. p. 337 (Tinnevely Hills & Coonoor Ghat, S. India: London), and Cat. Sn. Brit. Mus. ii, 1894, p. 84, pl. iv, fig. 2; Ferguson, J. Bombay N. H. S. x, p. 72; Wall, *ibid.* xxix, 1923, p. 624, and Rec. Ind. Mus. xxii, 1921, p. 156.

Dendrophis formosus grandoculis, Meise & Hennig, Zool. Anz. Leipzig, xcix, 1932, 11/12, p. 286.

Maxillary teeth 31 to 33, posterior largest; snout broader and squarer than in *picta*; eye as long as, or a little longer than, its distance from the anterior border of the nostril; internasals as long as the prefrontals; temporals 1+2 or 2+2; 9 supra-

labials, 4th just touching, 5th and 6th below the eye; vertebral scales feebly enlarged, at mid body not broader than the outer row of scales, the posterior margin rounded or obtusely pointed. Scales in 15 15 11 or 9 rows V. 167-189; C 117-124; A 2

Olive-brown above, with small, black, irregularly distributed blotches, eye bordered with whitish, no lateral stripes on the body, no black temporal stripe, lower parts olive, darker behind than in front, with or without small black spots on the sides, 3 black lines along the tail, one on each side and one below

Total length ♀ 1280, tail 350 mm

Range The Western Ghats, south of lat 15° (Travancore, Tinnevely, Nilgiri Hills, Wynad)

168 *Ahaetulla gorei*.

Dendrophis gorei Wall, 1910, J Bombay N H S xix, p 829, pl. —, figs 1-3 (Jaipur Naga Hills, Assam: London), Annandale, Rec Ind Mus viii, 1912 p 48; Wall, ibid. xxii, 1921, p 153, and J Bombay N H S xxii, 1913, p 639, and xxix, 1923, p 623.

Dendrophis biloreatus Wall, 1909, J Bombay N H S xviii, p 273, pl. — figs 1-3 (Sadiya, Assam: London) and xxix, 1923, p 623, and Rec Ind Mus xxi, 1921, p 159

Closely allied to *cyanochloris*. Maxillary teeth 22 to 25, posterior largest, snout broadly rounded; eye as long as its distance from the anterior border of the nostril; internasals shorter than the prefrontals, temporals 1+1+2, 8, rarely 9, supralabials, normally 4th and 5th touching the eye; vertebral scales strongly enlarged, at mid-body broader than the outer row of scales, the posterior margin truncate or concave. Scales in 13 13 11 or 9 rows V 187-199, C 139-154; Hemipenis as in *tristis*.

Bronze-brown above, greenish or greyish below, a more or less distinct yellowish stripe along scale rows 1 and 2, a black stripe along each side of the head, extending on to the neck, where it breaks up into vertical bars, lips and chin yellowish. Total length ♀ 900, tail 320 mm.

Range The Eastern Himalayas (Darjeeling); Assam north to the Abor country; Burma (Toungya), Tong King

The type of *biloreatus* cannot now be found, except that it has two loreal shields, it appears to be identical with the present species.

169 *Ahaetulla bifrenalis*.

Dendrophis bifrenalis Boulenger, 1890 F B I, p 333 (Ceylon: London), and Cat Sn. Brit Mus ii 1894, p 80 pl 4 fig. 1. Wall, Rec Ind Mus xxi, 1921, p 168, and Sn. Ceylon, 1921, p 215, fig. 44, and J Bombay N H S xxix, 1923, p 624.

Maxillary teeth 20 to 25, posterior largest; snout broadly rounded; eye as long as its distance from the centre or the anterior border of the nostril; internasals shorter than the prefrontals; 2 loreals, one behind the other; temporals 1+2 or 2+2; 9 supralabials, 4th just touching, 5th and 6th below the eye; vertebrals strongly enlarged, broader than the outer row of scales at mid-body, the posterior margin truncate or concave. Scales in 15:15:11 rows. V. 154-176; C. 144-175; A. 2.

Bronze-brown above; a greenish-yellow line along the outer row of scales, sometimes edged with black spots; a black stripe along the side of the head, strong on the temple, and passing on to the neck, where it breaks up into oblique bars; ventrals and subcaudals between the lateral keels greenish-yellow, brownish or bluish outside the keels; upper lip and chin yellowish.

Total length: ♀ 1030, tail 380 mm.

Range. Ceylon; Southern India (Trivandrum, Travancore).

170. *Ahætulla caudolineolata*.

Dendrophis caudolineolatus Günther, 1869, P. Z. S. p. 508, pl. xl, fig. 1 (Ceylon: London); Boulenger, F. B. I. 1890, p. 339, and Cat. Sn. Brit. Mus. ii, 1894, p. 85; Wall, Rec. Ind. Mus. xxii, 1921, p. 151, and Sn. Ceylon, 1921, p. 218, and J. Bombay N. H. S. xxix, 1923, p. 623.

Dendrophis gregorii Haly, 1888, Taprobanian, iii, p. 51 (Ceylon).

Dendrophis effrenis Werner, 1909, Jahrb. Hamburg Wiss. Anst. xxvi, p. 221 (Colombo, Ceylon: Hamburg); Wall, Sn. Ceylon, 1921, p. 219, and J. Bombay N. H. S. xxix, 1923, p. 623.

Maxillary teeth 29 to 32, posterior largest; snout broadly rounded; eye as long as its distance from the anterior border of the nostril; internasals shorter than the prefrontals; temporals 1+2; 8 supralabials, 4th and 5th touching the eye; vertebrals feebly enlarged, at mid-body narrower than the outer row of scales, the posterior margin rounded or truncate. Scales in 13:13:9 rows. V. 149-164; C. 119-128; A. 2.

Hemipenis as in *tristis*.

Bronze-olive above, anteriorly with oblique, narrow, black streaks; tail with 4, more or less distinct, black longitudinal lines, two on each side; a narrow black temporal streak; upper lip and lower jaw yellowish; belly pale greenish or greyish.

Total length: ♂ 650, tail 235 mm. (Wall, 870 mm. ♀.)

Range. Ceylon; Southern India (Ramnad, Travancore).

A rare snake, found only in the hills.

171 *Ahaetulla tristis*.

COMMON INDIAN BRONZE BACK

- Russell Ind Serp i, 1796, p 36, pl 31, Hyderabad, and u. p 29, pl 35, Bombay, and u. p 30, pl 26, Tranquebar
Coluber tristis Daudin, 1807, Hist Nat Rept vi p 430 (based on Russell's pl 31) — *Dendrophis tristis* Boulenger, Cat Sn. Brit Mus n. 1891, p 88, Wall, J Bombay N H S xix, 1909-10, pp 347 and 776, col pl. xii and xxix, 1923 p 823, and Rec Ind Mus xii, 1921, p 160 and Sn Ceylon, 1921, p 221, fig. Prater, J Bombay N H S xxx, 1924, p 170, Shaw & others J Bengal N H S xiv, 1940, p 111
Leptophis mancus Bell, 1825, Zool Journ u. p 329 (based on Russell n. pl 25)
Dendrophis mancus Bore 1827, Isis, p 542 (based on Russell, n. pl 25)
Dendrophis chairecos Bore, 1877, Isis p 541 (based on Russell, n. pl 26)
Chrysopela borei A Smith, 1836, Mag Zool Bot p 144 (Deylon)
— *Dendrophis borei* Cantor, F L S 1839, p 53 (drawing in Bodleian Lib)
Dendrophis helena Werner, 1892, Zool. Anz xvi, p 8 (Ceylon Berlin)
Dendrophis tristis var *saprobiana* Wall 1921, Sn. Ceylon, p 221 (Ceylon)
Dendrophis pictus, Boulenger, F B I 1890, p 237 (in part)

Mandibular teeth 17 to 22, posterior usually smallest, snout broadly rounded, eye as long as its distance from the nostril, internasals usually a little shorter than the prefrontals, temporals 2+2, 9 supralabials, 5th and 6th touching the eye, vertebral scales feebly enlarged, narrower than the outer scales, the posterior margin rounded Scales in 15 15 11 or 9 rows V 163-197, C 108-145, A 2

Hemipenis undivided, extending to the 8th caudal plate; at about the middle of the organ and beside the sulcus there is a prominent tongue of tissue, from which two sinuous folds extend forwards, the area distal to the folds is calyculate, that proximal to it spinose, except the base of the organ, which is plicate

Bronze brown or purplish brown above, light greyish, greenish or yellowish below a more or less distinct buff flank stripe along the outer two scale rows, edged or spotted with black, an indistinct black temporal stripe extending on to the neck, where it may break up into vertical bars, vertebral scales on neck and forebody sometimes yellow, upper lip yellow, the eye often margined with the same colour

Total length ♂ 1050, tail 325, ♀ 1300, tail 390 mm

Range Ceylon and Peninsular India as far as Sind in the north west and Darjeeling in the north-east For its more exact distribution I quote Wall (1910) It is very common in Ceylon and in S India about Trichinopoly and Cannanore and in the Western Ghats in the plains and hills of Travancore,

and about Matheran near Bombay; it is uncommon in the plains to the north of the Tapti river, and does not appear to occur at all in the Indus Basin except near the mouth of the river. Blanford, collecting at Ajmere for 3 years, failed to procure a specimen; the Ganges Valley appears to be outside its limits except at the eastern part near the Delta; it has not been recorded from Central India or the Central Provinces; it is quite common in the Eastern Himalayas in the vicinity of Darjeeling at between 2,500 and 5,000 feet altitude.

Wall (1910) has given a good account of the habits of this common Indian snake. Like the other Oriental members of the genus, it is shy and timid in disposition, and does not bite readily when handled. It feeds mainly on lizards and frogs. He says: "It is truly astonishing with what speed it can ascend an almost bare tree trunk from the ground, and disappear in the branches above."

172. *Ahætulla subocularis*.

Dendrophis subocularis Boulenger, 1888, Ann. Mus. Civ. Genova, (2) vi, p. 600, pl. vi, fig. 2 (Bhamo, Upper Burma: London and Genova), and F. B. I. 1890, p. 338.—*Dendrophis subocularis*, Boulenger, Cat. Sn. Brit. Mus. ii, 1894, p. 89; Smith, J. Bombay N. H. S. xxiii, 1915, p. 785, and P. Z. S. 1921, p. 426; Gyldenstolpe, Kungl. Sv. Vet. Akad. Stockholm, lv, 1916 (3) p. 15; Wall, Rec. Ind. Mus. xxii, 1921, p. 159, and J. Bombay N. H. S. xxix, 1923, p. 625, and xxx, 1925, p. 813.
Dendrophis tristis subocularis Meise & Hennig, Zool. Anz. Leipzig, xcix, 1932, p. 292.

Closely allied to *tristis*. Maxillary teeth 21 to 23, posterior smallest; snout broadly rounded; eye as long as its distance from the anterior border of the nostril; internasals a little shorter than the prefrontals; temporals 2+2; 7 or 8 supralabials, one long shield touching the eye with 3 or 4 anterior and 3 posterior to it; vertebrals feebly enlarged, much narrower than the outer row of scales, their posterior margins rounded. Scales in 15:15:11 or 9 rows. V. 153-175; C. 85-105; A. 2.

Hemipenis extending to the 10th caudal plate, undivided and spinose throughout, the spines in the middle of the organ being largest; the proximal end is plicate; starting a short distance behind the tip and extending for about half the length of the organ beside the sulcus, there is a thick fold or tongue of tissue.

Bronze above, the colour ending abruptly along the middle of scale row 2; rest of lower parts pearly white, or greenish-white; a pale brown stripe along the side of the body on the lower half of scale row 1 and adjacent part of the ventral shields present or absent; a dark stripe along the side of the head, passing on to the neck where it may break up into

vertical bars vertebral scales on neck and forepart of body sometimes yellowish

Total length ♀ 880 tail 250 mm

Range. Burma (Bhamo), the whole of diam, except the north-eastern plateau as far south as lat 11°. Dran on the Langbian Plateau & Annam

173 (*Ahaetulla caudolineata*.)

Ahaetulla caudolineata Gray, 1824 Ill. Ind. Zool. ii, pl. 81 (no type loc. given) — *Dendrolapha caudolineata* Boulenger F. B. I. 1890 p. 339 and Rept. Malay Pen. 1912 p. 147; Smith, Bull. Brit. Mus. No. 3 1930, p. 52

A Malayan species that has been found as far north as Tapir Isthmus of Kra

Genus CHRYSOPELEA.

Chrysopela Hout. 1826 in Verres. Bull. Sci. Nat. x p. 237 and Latr. 1827 p. 520 (type *Col. ornatus*); A. Smith, Mag. Zool. Bot. 1836 p. 141 Boulenger F. B. I. 1890 p. 371 and Cat. Sn. Brit. Mus. iii. 1896 p. 193. Meun. and Kennel Zool. Anz. Berlin. xiv. 1923 p. 138, Parker Ann. Mag. Nat. Hist. (10) xviii. 1926, p. 227, Brongersma, Zool. Meded. Leiden, xx, 1928 p. 241
Type (not of Humbert 1822) Fitzinger 1826, Deuss. Class. Rept. p. 27 (type *Coluber strobilacea* Daudin)

Maxillary teeth 20 to 22 the last 3 or 4 a little larger than the others and grooved. Head distinct from neck, eye rather large, with round pupil. Body elongate, scales smooth or feebly keeled, oblique, with apical pits, in 17. 17 15 rows, ventrals with a suture like lateral keel and a notch on each side corresponding to the keel, tail long, subcaudals in two rows, keeled and notched like the ventrals. Hypapophyses present or absent on the posterior dorsal vertebrae

Range The Oriental Region and East Indian Islands

I recognize five species, three inhabiting India and Indo-China. Except that the posterior teeth are grooved, the maxilla of *Chrysopela* resembles that of *Ahaetulla*

Brongersma has shown recently* that in *Chrysopela ornata* the hypapophyses on the posterior dorsal vertebrae may be present or absent. An examination of the extensive material in the British Museum shows that their presence or absence can be correlated with geographical distribution, and also with colour pattern. The processes are absent in the specimens inhabiting India and Indo-China, but present in those in the

* On the Presence or Absence of Hypapophyses under the Posterior Precaudal Vertebrae in some Snakes, Zool. Meded. Leiden, xx, 1928, pp. 240-242.

Malay Peninsula and Archipelago. They must therefore be regarded as distinct species. For the Malayan form the name *paradisi* is available. My reasons for regarding *taprobanica* as distinct are given under that species.

Key to the Species.

- I. Hypapophyses absent on the posterior dorsal vertebrae.
 Last ventral shield divided; colour green above, each scale with a black median line. *ornata*, p. 251.
 Last ventral shield not divided; olive with black cross-bars *taprobanica*, p. 254.
- II. Hypapophyses present throughout the vertebral column.
 Black above, each scale with a central yellow spot *paradisi*, p. 254.

174. *Chrysopelea ornata*.

GOLDEN TREE SNAKE.

Russell, Ind. Serp. ii, 1801, p. 4, pl. 2, "Kalla Jin" (no type loc. given).

Coluber ornatus Shaw, 1802, Gen. Zool. iii, p. 477 (based on Seba, i, t. 94, f. 7 and ii, t. 7, f. 1, and t. 61, f. 2; East India Islands).—*Chrysopelea ornata*, Boie, Isis, 1827, p. 546; Boulenger, F. B. I. 1890, p. 371, and Cat. Sn. Brit. Mus. iii, 1896, p. 196 (in part); Wall, J. Bombay N. H. S. xviii, 1908, p. 227, col. pl., and xxix, 1924, p. 878, and Sn. Ceylon, 1921, p. 305 (in part); Thompson, P. Z. S. 1913, p. 420; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 175, and Rec. Ind. Mus. xlii, 1940, p. 482; Cochran, Proc. U.S. Nat. Mus. lxxvii, 11, 1930, p. 33; Pope, Rept. China, 1935, p. 318; Bourret, Serp. Indo-Chine, 1936, p. 321.

Coluber ibibiboca Daudin, 1802, Hist. Nat. Rept. vi, p. 327 (based on Russell's "Kalla Jin").

Chrysopelea ornata ornatissima Werner, 1925, Sitz. Ber. Akad. Wiss. Wien, cxxxiv, p. 61 (Angkor Wat, Cambodia: Vienna).

Snout much depressed, broadly truncate; internasals shorter than the prefrontals; frontal bell-shaped, about as long as its distance from the end of the snout; loreal elongate; 1 large preocular; 2 postoculars; temporals 2+2; usually 9 supralabials, 4th just touching, 5th and 6th below the eye; anterior genials shorter than the posterior; scales smooth or feebly keeled; anal and last ventral divided. V. 207-230; C. 120-138 (Ceylon and S. India); V. 213-234; C. 110-138 (Indo-China).

Hemipenis extending to the 34th caudal plate, undivided; extending from near the distal end of the organ to the tip are several prominent, oblique folds through one of which the sulcus passes; the entire organ is longitudinally plicate, the area proximal to the oblique folds being strongly spinose.

Colour very variable. Boulenger has listed many colour forms, but the range he has allotted some of them is based, I believe, on inaccurate data. After examining material the origin of which is not in doubt, I find that each colour form can be restricted to a definite geographical area.

The young are black above, with narrow pale greenish-yellow cross bars, these may be dilated vertically and on the sides of the body and the scales may or may not have a black mesial streak. As age advances the green coloration gradually increases in extent; adults in the area covered by this work are marked as follows —

I Greenish yellow or pale green above, each scale with a mesial streak or spot of black, and more or less edged with



Fig. 86 — *Chrysocelys ornata*, Var. I.

black, at regular intervals the scales are entirely black, thus forming cross-bars, a series of large reddish or orange vertebral spots shaped like tetrapetalous flowers present or absent, ventrals greenish, the shield outside the lateral keel with a black spot, or edged with black, head black with yellow cross-bars and spots (fig 86), subcaudals edged with black or with a black mesial streak. The flower-shaped spots are present in all Ceylonese specimens that I have seen; they are placed on each alternate cross-bar; they are less evident, or absent, in specimens from Southern India.

Range. Ceylon, and the Western Ghats south of the Goa Gap (Jide Wall).

II. Like the preceding but without the vertebral spots. In specimens from Burma and Siam the black cross-bars are much less conspicuous and may be entirely absent, the mesial

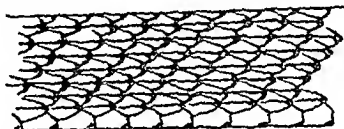
streak on each scale may then give the appearance of black longitudinal lines (fig. 87 A). In specimens from French Indo-China the black cross-bars are usually very distinct, and they then closely resemble specimens from Southern India.

Range. The whole of the Indo-Chinese region, extending in the north-west to the Triangle in Upper Burma and the Darjeeling district, and to Patna and Buxa in Bihar and Orissa; in the north-east to Tong-King and Southern China (Hong Kong); south to lat. 6° N.

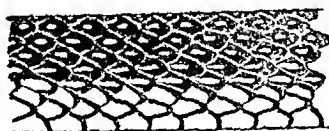
Total length: ♂ 1040, tail 300; ♀ 1100, tail 275 mm.

Examples measuring 1400 mm. in total length are not uncommon.

Many accounts have been written of this snake, of its boldness and courage, its remarkable climbing powers and its



A



B

Fig. 87.—Dorsal pattern of A. *Chrysopelea ornata*, Var. II.;
B. *Chrysopelea paradisi*.

power of "flight." It is a common snake throughout Southern Indo-China, and its diurnal habits and fondness for human habitations make it well known there. Its tastes are catholic and it is prepared to devour anything that it can overcome. Lizards, mainly geckos, small mammals, birds, snakes and even insects have been recorded as part of its diet. I have seen one catch a full-grown mouse, crush it in its coils and swallow it, the whole operation being accomplished in mid-air, the snake being suspended by its tail only from a small branch. There are several accounts of combats between it and the large and powerful Geckos (*G. gecko* and *G. smithi*) some of which have lasted for over an hour. Its ability to climb perpendicular walls or trunks of trees by taking advantage of

every slight irregularity of surface and thus reach positions apparently quite inaccessible is amazing.

Its power of so called flight is well proved. The means by which this is accomplished has been explained by Shelford (1 Z 8 1906)

He took one to a height of 15 or 20 feet from the ground and allowed it to fall several times after one or two false starts it was felt to glide from the hands straightening itself out and hollowing the ventral surface as it moved and fell at an angle to the ground the body being kept rigid all the time. This concavity of the belly can often be seen in preserved specimens.

Short distances are negotiated by springing. I have seen one make a series of leaps from branch to branch in a tree coiling itself in preparation and then suddenly straightening the whole body out as it leaped across. The distances covered were between 3 and 4 feet and some of them were made in an upward direction.

Pairing in Bangkok takes place in June. From 6 to 12 very elongate eggs are laid at a time.

175 *Chrysopelea laprobanica*, sp. nov.

Chrysopelea ornata, Auct. (in part)

C. laprobanica has been hitherto regarded as a colour variety of *ornata* but it differs so entirely in coloration from the typical form which is also found in Ceylon that I must regard it as distinct. It has moreover two morphological differences which appear to be constant namely, the last ventral shield is never divided and the scales are always more or less distinctly keeled. V 198-214 C 107-123 A 2 (8 examples examined). 7 specimens from Ceylon of typical *ornata* have V 207-230 C 120-138.

Light olive brown above with narrow wavy black cross bars. a black spot on each ventral shield outside the lateral keel. subcaudals not spotted below, head as in *ornata*.

Total length ♀ 960 tail 270 mm.

Type ♀ Brit Mus 1906 7.21.1 from Hanthanh Ceylon.

Paratypes 1915 53 10-11 Kurunegala Ceylon.

Range Peculiar to Ceylon.

176 *Chrysopelea paradisi*

Chrysopelea paradisi Boc 1927 Isis p. 547 (Java).

Chrysopelea ornata (in part) Boulenger Rept. Malay Pen 191*

p. 177 fig. Ammandale J. Asiat. Soc. Bengal n.s. 1 1905

p. 126 de Roo J. Rept. Indo Austral. Arch. pol. L. 1917

p. 212, fig.

Like *ornata* but with the hypapophyses developed throughout the vertebral column and a different colour pattern.

Black above each scale with a central rounded or ovate

acuminate, greenish-yellow spot, and with or without a vertebral series of red or yellow tetrapetalous spots; pale greenish-yellow below, the ventrals often edged with black. Head as in *ornata*. In some individuals the central spot may have a median stippling (fig. 87 B).

Range. The Malay Peninsula extending up the west coast as far north as Mergui; Andaman Islands (Narcondam); Borneo and the Philippine Islands adjacent to it; Sumatra; Java.

Genus LYCODON.

WOLF SNAKES.

Lycodon Boie, 1826, in Ferussac's Bull. Sci. Nat. ix, p. 238 (in part); Fitzinger, Neue Class. Rept. 1826, pp. 29, 30 (type *aulicus*); Boulenger, F. B. I. 1890, p. 291, and Cat. Sn. Brit. Mus. i, 1893, p. 348 (in part); Wall, J. Bombay N. H. S. xvii, 1907, p. 614, and xxix, 1923, p. 612; Bourret, Serp. Indo-Chine, 1936, p. 150; Werner, Zool. Jahrb. Syst. lvii, 1929, p. 56.

Ophites Wagler, 1830, Syst. Amphib. p. 186 (type *subcinctus*).

Sphcodes (not of Latreille 1804), Dum. & Bib. 1853, Mem. Acad. Sci. xxiii, p. 461, and Erp. Gen. vii, 1854, p. 394 (type *albofuscus*).

Leptorhytaon Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 205 (type *Coluber jara*).

Tetragonosoma Günther, l. c. s. p. 253 (type *Lycodon effrenis*).

Tyleria Theobald, 1868, Cat. Rept. Asiat. Soc. Mus. p. 66 (type *hypsirhinoides*).

Maxillary bone strongly arched, and bent inwards anteriorly, with 3 to 6 anterior teeth increasing in size, fang-like, and separated by a toothless interspace from the rest, 7 to 15 in number, the last two of which are larger than the others. Head not or but slightly distinct from neck, depressed; eye moderate, with vertically elliptic pupil. Body elongate; scales in 19, 17 or 15 rows, smooth or feebly keeled, with apical pits; ventrals with or without a lateral keel; subcaudals paired, except in *travancoricus*. Hypapophyses absent in the posterior part of the vertebral column.

Common characters, unless otherwise stated: Head elongate, depressed; nostril between two nasals; diameter of the eye greater than its distance from the mouth; rostral much broader than high; internasals much shorter than the prefrontals; loreal elongate, at least twice as long as high; 2 postoculars; 3rd, 4th and 5th supralabials touching the eye.

Aberrations, such as union of the loreal with the prefrontal and an undivided anal when it is usually divided, have been recorded for several species (*aulicus*, *striatus*, *travancoricus*).

Range. The Oriental Region to Transcaspia and the Indo-Australian Archipelago.

With the exception of *L. subcinctus*, all the members of this genus appear to be excellent climbers. They are nocturnal in their habits, extremely active in their movements, and generally vicious in disposition, biting readily when molested;

the small size of their teeth however prevents any serious damage being done. Lizards form the main part of their diet those species that frequent dwellings (*subicus*, *truncatus*) living mainly on Geckos the others on Scinks small mammals such as mice have also been recorded in their diet. All the species are oviparous the eggs being elongate their length from two to three times that of their breadth.

Lycodon, *Dinodon* and *Cercaspis* are three closely related genera. *Cercaspis* is readily distinguished by the character of its vertebrae the other two can be separated from one another on their dentition and the shape of the maxillary bone. The division between them however is not clearly marked.

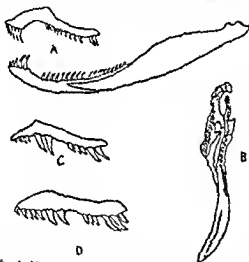


Fig. 88—A Maxilla and mandible and B Palato-maxillary arch of *Lycodon subicus*; C Maxilla of *Lycodon forsteri*; D Maxilla of *Dinodon flavozonatum*.

Lycodon fasciatus (as pointed out by Wall 1925) and *Dinodon* gammites connecting them. The centre of distribution of *Lycodon* is the Oriental Region. *Dinodon* is Chinese the meeting place of the two being the Eastern Himalayas and the Trans Himalayan area. *Lycodon* is a genus of small snakes only *L. subcinereus* by far the largest reaching 1000 mm in length. Most of the members of *Dinodon* are considerably larger. Wall has stated (1908 p. 779) that in 9 species of *Lycodon* examined by him the apical pits are in pairs whereas in *Dinodon* they are single. After examining species of both genera I find myself unable to agree with his opinion.

According to him the iris in *Lycodon* is invisible in life, the whole eye being black, a condition rarely found in snakes.

Hurrial sanguiniventer Cantor, 1839, p. 52 (Valley of Nepal : coloured sketch in Bodleian Library) is, from the drawing, an undoubted *Lycodon*, but I am unable to assign it to any known species. The head shows two superposed loreals, both touching the eye ; no preocular ; 8 supralabials, 3rd and 4th touching the eye ; temporals 1+2. The scales are keeled. V. 207. angulate laterally ; C. 99, the anterior 14 entire.

Deep claret purple above, with metallic tinge ; blood-coloured beneath.

Total length : 2 ft. 4 in. ; tail 7 in (700 mm.).

See also Günther, Rept. Brit. India, 1864, p. 222, fig. head. Cantor's figure of the head does not agree with that given by Günther.

Key to the Species.

A. Scales in 17 rows.

I. No preocular ; prefrontal and loreal in contact with the eye ; scales feebly keeled

subcinctus, p. 258.

II. A preocular separating the prefrontal from the eye ; loreal not touching the eye ; scales smooth.

a. Loreal not or but slightly in contact with the internasal ; anterior and posterior nasal shields subequal.

Anal undivided ; back with light cross-bars which are never pure white

travancoricus, p. 259.

Anal divided ; back with light cross-bars, the anterior of which are pure white

laeensis, p. 259.

b. Loreal extensively in contact with the internasal.

1. Ventrals not angulate laterally ; posterior nasal usually distinctly smaller than the anterior.

Snout not projecting ; 8 or 9 supralabials ; black above, each scale with two white spots

jara, p. 260.

Snout projecting ; 8 supralabials ; back with a series of light vertebral spots or cross-bars

striatus, p. 261.

Snout projecting ; 9 supralabials ; back with a series of small white vertebral spots....

flavomaculatus, p. 262.

Snout projecting ; 8 supralabials ; back with light reticulations

mackinnoni, p. 263.

2. Ventrals angulate laterally.

9 supralabials ; posterior nasal not smaller than the anterior

aulicus, p. 263.

III. A preocular ; loreal touching the eye ; scales keeled ; ventrals angulate laterally

fasciatus, p. 266.

B. Scales in 15 rows.

7 supralabials ; T. 1+2.....

kundui, p. 260.

C. Scales in 19 rows.

A preocular ; scales keeled

paucifasciatus, p. 267.

177 *Lycodon subcinctus*

Russell, Ind. Serp. II, 1801, p. 46, pl. xii (Java)
Lycodon subcinctus Bosc, 1827, Ess., p. 551 (based on Russell's plate) Boulenger, Cat. Sn. Brit. Mus. 1, 1893, p. 259 and Rept. Malay Pen. 1912, p. 133, Smith, J. Nat. Hist. Soc. Siam, vi, 1923, p. 202 — *Ophites subcinctus*, Günther Rept. Brit. Ind. 1864, p. 322 Smith, Bull. Raffles Mus. No. 3, 1930, p. 46; Bourret, Serp. Indo-Chine, 1935, p. 157; Pope, Rept. China, 1935, p. 196 fig. head, Herklotz Hong Kong Nat. vi, 1935, p. 195, fig. head.
Elapoides annulatus Saurage, 1834, Bull. Soc. Philom. (7) viii, p. 144 (Sumatra Paris)

Snout broad, posterior nasal higher than the anterior; no preocular, the prefrontal in contact with the eye; loreal touching the eye, widely separated from the internasal; temporals 1+2, 8 supralabials, anterior pair of genials as long as or a little longer than, the posterior. Scales in 17 17 15 rows feebly keeled, the outer rows usually smooth. V 197-230, angulate laterally, C 71-90, A. 2

Hemipenis extending to the 13th caudal plate, forked near the tip, the distal $\frac{1}{4}$ is calyculate, the edges of the calyces being set with numerous fine fleshy spines; the remainder of the organ has longitudinal folds

Greyish or purplish black above, with widely separated, white cross bars, 10-13 on the body; these markings very distinct in the young but becoming less distinct and usually disappearing entirely on the hinder part of the body in the adult, white below, the ventrals sometimes edged with black, hinder part of the head white in the young, greyish or blackish in the adult, in the young the dark coloration of the back is continued across the belly; under surface of tail grey in the young, white in the adult. Adult specimens, particularly those from the northern part of its range, have the white cross-bars thickly speckled with black.

Total length. ♂ 900, tail 190, ♀ 1000, tail 180 mm.

Range The whole of Siam and French Indo-China; Hainan; Southern China, Hong Kong; the Malay Peninsula and Archipelago

Rare in the northern part of its range, except on Hong Kong I., where according to Herklotz it is not uncommon.

L. subcinctus is found usually at low altitudes, but has been obtained on Gunung Tahan in the Malay Peninsula at 5,400 feet altitude (Smith, 1930). Its food appears to consist entirely of scinks (Pope, 1935). Kopstein (1930) has figured the eggs laid by a Javanese specimen. Five were laid between May 20th and 24th and hatched out on August 11th.

178. *Lycodon travancoricus*.

Cercaspis travancoricus Beddome, 1870, Madras Month. J. Med. Sci. ii, p. 169 (Travancore Hills: London) and J. Soc. Bibl. Nat. Hist., I, 1940, p. 327 (reprint).—*Lycodon travancoricus*, Boulenger, F. B. I. 1890, p. 293, and Cat. Sn. Brit. Mus. i, 1893, p. 355, pl. xxiv, fig. 3; Wall, J. Bombay N. H. S. xvi, 1905, p. 297, and xix, 1909, p. 756, and xxvi, 1919, p. 565, and xxix, 1923, p. 613; Ferguson, *ibid.* x, 1895, p. 71.

Snout broad; anterior and posterior nasals subequal; loreal normally not touching the eye, not touching the internasal; a preocular; temporals 2+3 or 3+3; 9 supralabials; anterior pair of genials as large as or a little larger than the posterior. Scales in 17:17:15 rows, smooth. V. 176–206, angulate laterally; C. 64–76, paired, or some, rarely all of them, single; A. 1

Hemipenis extending to the 12th caudal plate, forked at the tip; the distal one-third can be divided into two parts, a larger portion adjacent to the sulcus which is flounced and more or less calyculate, the flounces being large and arranged in oblique or transverse folds, and a narrower portion opposite to the sulcus which is spinose; the remainder of the organ is spinose, the largest spines being opposite the sulcus; at the extreme tip of the organ are two small smooth areas or pockets.

Dark purplish-brown or blackish above, with pale yellow cross-bars which bifurcate on the sides, enclosing more or less triangular spots; the first cross-bar is on the nape; those on the anterior part of the body are further apart than those on the posterior; all of them are more or less distinctly speckled with black; uniform white below; upper lip usually brown, spotted with white.

Total length: ♂ 600, tail 125; ♀ 625, tail 120 mm. (Wall, 742).

Range. The Western Ghats, as far north as Matheran. Wall also records it from South Arcot, Vizagapatam, and Jubblepore in the Central Provinces. Common in the Wynaad and the Nilgiris.

179. *Lycodon laoensis*.

Lycodon laoensis Günther, 1864, Rept. Brit. Ind. p. 317 (Laos, French Indo-China: London); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 354, and Rept. Malay Pen. 1912, p. 132; Smith, J. Nat. Hist. Soc. Siam, ii, 1916, p. 160, and Bull. Raffles Mus. No. 3, 1930, p. 46.

Anterior and posterior nasals subequal; loreal not, or just, touching the internasal, not touching the eye; a preocular, temporals 2+3; 9 supralabials; the anterior pair of genials much larger than the posterior. Scales in 17:17:15 rows, smooth. V. angulate laterally, 165–187; C. 60–73; A. 2.

Hemipenis extending to the 10th caudal plate, forked at the tip, the extremity of the organ is calyculate, the calyces being very large and folded transversely; the remainder of the organ is spinose, the apices being arranged in longitudinal series, the largest ones are opposite the sulcus

Brownish or bluish black above, with bright yellow cross-bars which expand laterally, posteriorly they are narrower and closer together, and the lateral expansions enclose triangular spots, a yellow bar on the nape; upper lip and lower parts uniform white

Total length ♀ 475, tail 90 mm

Range The whole of Siam and the Malay Peninsula as far south as Patani, Laos, Cochín China; S Annam (Langbian plateau)

A female caught in northern Siam on April 3rd contained 5 eggs

180 *Lycodon kundul*, sp. nov

Anterior and posterior nasal subequal; loreal twice as long as high well separated from the internasal and the eye; temporals 1+2, 7 supralabials, 3rd and 4th touching the eye, 4 infralabials in contact with the anterior pair of genials, which are much larger than the posterior Scales smooth, in 15 15·15 rows V. 180, strongly angulate laterally; C 70; A 2

Bluish black above, with narrow white cross-bars, on the posterior half of the body they are closer together and bifurcate or break up on the sides A white bar on the nape; lower parts (ventrals and outer scale rows) white

Total length 225, tail 38 mm

Described from a single juvenile specimen obtained by Dr Kundu of the Harcourt Butler Institute, Rangoon, at Gyobu, Taikky Township, Pegu district I have pleasure in naming it after him

L. kundul is most nearly related to *L. laocensis*, from which it differs in the reduction of the number of scales round the body as well as of the labials and temporals

No member of the genus has yet been described with only 15 scales round the body, in dentition and in the shape of the maxillary bone, however, this new species is a typical *Lycodon*

181 *Lycodon jara*

Russell, Ind. Serp. I, 1796, p. 19, pl. xiv (Ganjam)

Crotalus jara Shaw, 1802, Gen. Zool. iii, p. 525 (based on Russell's plate) — *Lycodon jara*, Stoliczka, J. A. S. Bengal, xl, 1871, p. 443, Boulenger, F. B. I. 1890, p. 292, and Cat. Sn. Brit.

Mus. i, 1893, p. 350, and Rec. Ind. Mus. ix, 1913, p. 338 ; Wall, J. Bombay N. H. S. xix, 1909, pp. 344 and 619.—*Leptorhylaon jara*, Günther, Rept. Brit. Ind. 1864, p. 321.—*Ophites jara*, Wall, J. Bombay N. H. S. xxix, 1923, p. 612 ; Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 155.
Coluber bipunctatus Cantor, 1839, P. Z. S. p. 52 (Balasore, Bengal : sketch in Bodleian Library).

Snout not projecting beyond the lower jaw ; anterior nasal usually larger than the posterior ; loreal in contact with the internasal, not touching the eye ; a preocular ; temporals 1+2 or 2+3 ; 8, sometimes 9, supralabials ; anterior pair of genials larger than the posterior. Scales in 17 : 17 : 15 rows, smooth. V. 167–188, not angulate laterally ; C. 52–74 ; A. 2.

Hemipenis extending to the 10th caudal plate ; the distal $\frac{1}{2}$ is obliquely flounced and calyculate, the remainder of the organ spinose, the spines being large and of more or less equal size throughout.

Brownish or purplish-black above, stippled all over with white (yellow in life), the pattern being formed by small spots or short longitudinal lines, two on each scale ; upper lip and lower surface uniform white ; a white collar always present in the young.

Total length : ♂ 535, tail 115 ; ♀ 550, tail 105 mm.

Range. Ganjam in the northern part of the Madras Presidency ; the Eastern Himalayas as far west as longitude 85° ; Bengal ; Assam.

182. *Lycodon striatus*.

Russell, Ind. Serp. i, 1796, pp. 22, 32, pls. xvi & xxvi (Vizagapatam and Hyderabad).

Coluber striatus Shaw, 1802, Gen. Zool. iii, p. 527 (based on Russell's pl. xvi).—*Lycodon striatus*, Stoliczka, 1870, J. A. S. Bengal, xxxix, p. 200 ; Anderson, P. Z. S. 1871, p. 187 ; Boulenger, F. B. I. 1890, p. 292, and P. Z. S. 1891, p. 632, and Cat. Sn. Brit. Mus. i, 1893, p. 349 ; Annandale, J. A. S. Bengal, 1904, p. 208, and Mem. A. S. Bengal, i, 1906, p. 194 ; Green, Spol. Zeyl. ii, 1905, p. 205 ; Wall, ibid. 1907, p. 174, and J. Bombay N. H. S. xviii, 1907, p. 110, and xix, 1909, p. 102, col. pl., and xx, 1911, p. 1034 ; Nikolsky, Faune de la Russie, 1916, ii, p. 74 ; Cernov, C. R. Acad. Sci. Leningrad (n.s.), iii, 1935, p. 189.—*Ophites striatus*, Wall, Sn. Ceylon, 1921, p. 147, and J. Bombay N. H. S. xxix, 1923, p. 612 ; Ingoldby, ibid. xxix, 1923, p. 127.

Coluber malignus Daudin, 1803, Hist. Nat. Rept. vii, p. 46 (based on Russell's pl. xvi).

Lycodon galathea Daudin, 1803, l. c. s. p. 55 (based on Russell's pl. xxvi).

? *Lycodon napei* Dum. & Bib. 1854, Erp. Gen. vii, p. 384 (Indes Orientales : Paris).

Snout projecting beyond the lower jaw anterior nasal usually larger than the posterior ; loreal in contact with the

internasal, not touching the eye, a preocular; temporals 2+3 rarely 1+2, 8 supralabials, anterior pair of genials larger than the posterior. Scales in 17-17.15 rows, smooth. V South of lat 20°, 154-166, north of lat 20°, 163-195. C South of lat 20°, 35-50, north of lat 20°, 44-58, A 2. The lowest caudal count (35) is from Ceylon, the highest ventral count (195) from the Perso-Baluchistan frontier.

Hemipenis as in *jara*.

Dark brown or blackish above with white or yellow cross bars, which expand laterally and usually also dorsally; on the sides of the body anteriorly the expansions enclose triangular spots, on the posterior part the bars are narrower and closer together, and on the sides break up to form reticulations; a white bar on the nape present or absent; upper lips and lower parts uniform white.

Total length ♀ 370 tail 60 mm

Range Ceylon, India as far east as Chota Nagpur, north to the Punjab (Agra, Lahore, Simla), Sind, Baluchistan; N W F Provinces and westwards to Transcaspia.

According to Wall, *L. striatus* is found in the plains and in the hills up to 2,000 feet altitude, and in certain parts of India is comparatively common. Ingoldby (1923), on the other hand, records it in Waziristan at 3,600 and 5,000 feet. Eggs, 2 to 4 in number, 33×8 mm in size, are laid in July and August. Wall states that it is timid in disposition and that he has never known one to strike, no matter what the provocation. Usually it makes no endeavour to escape, but coils itself up, and if touched or teased hides its head beneath its coils.

183 *Lycodon flavomaculatus*.

Lycodon flavomaculatus Wall 1907, J. Bombay N.H.S. xvi, p. 612, pl. — (Oudh and Kirkee, London). — *Ophites flavomaculatus* ibid. xxx, 1923, p. 613.

Differs from *striatus* in having 9 supralabials instead of 8, in the characters of the hemipenis, and in colour pattern. Black above, with a series of small roundish or triangular, yellow, vertebral spots, opposite which bars of the same colour descend and broaden to form a reticulation on the flanks. V 170-183, C 53-63.

Hemipenis extending to the 15th caudal plate, forked at the tip, the distal $\frac{1}{2}$ is beset with large papillæ, the remainder of the organ is spinose, those opposite the sulcus being the largest.

Range Western Ghats (Nasik, Oudh, Kirkee, Poona, Doolah, Dharwar, Sangli), Berar (Buldana). A rare snake.

184. *Lycodon mackinnoni*.

Lycodon mackinnoni Wall, 1906, J. Bombay N. H. S. xvii, p. 29, fig. head (Mussooree: London).—*Ophites mackinnoni*, Wall, ibid. xxix, 1923, p. 614.

Snout projecting beyond the lower jaw; posterior nasal distinctly smaller than the anterior; loreal extensively in contact with the internasal, not touching the eye (united with the prefrontal in the type); a preocular; temporals 1+2 or 2+3; 8 supralabials; anterior genials larger than the posterior. Scales in 17:17:15 rows, smooth. V. 163–187, feebly angulate laterally; C. 48–56; A. 2.

The hemipenis can be divided into two parts, a distal transversely fionced portion and a proximal in which there are a few, very large spines.

Dark brown or chocolate above, with a network of white lines, the light colour being confined to the edges and tips of the scales; uniform white below or the ventrals edged with brown.

Total length: ♀ 365, tail 65 mm.

Range. Western Himalayas (Mussooree, Almora, Muktesar near Naini Tal).

185. *Lycodon aulicus*.

COMMON WOLF SNAKE.

Russell, Ind. Serp. ii, 1801, p. 41, pl. xxxvii (Java), and p. 42, pl. xxxix (India).

Coluber aulicus Linn., 1754, Mus. Adolph. Frider. i, p. 29, pl. xii, fig. 2 ("America": type in Stockholm), and 1758, Syst. Nat. 10th Edit. p. 220.—*Lycodon aulicus*, Günther, Rept. Brit. Ind. 1864, p. 316; Blyth, Zool. Andamans, 1863, p. 365; Stoliczka J. A. S. Bengal, xxxix, 1870, p. 201; Murray, Zool. Sind, 1864, p. 383; Boulenger, F. B. I. 1890, p. 294, and Cat. Sn. Brit. Mus. i, 1893, p. 352, and Rept. Malay Pen. 1912, p. 131; Andersson, Bihang K. Sven. Vet. Akad. Stockholm, xxvi, 1899, 6, iv, p. 16; Laidlaw, Fauna Mald. Lacc. 1902, p. 121; Wall, J. Bombay N. H. S. xv, 1904, p. 706, and xviii, 1907, p. 112, and xix, 1909, pp. 87, col. pl., 344 & 619, and xix, 1910, p. 756, and xxvi, 1919, p. 565; D'Abreu, Sn. Nagpur, 1916, p. 20; Smith, P. Z. S. 1927, p. 221; Bourret, Serp. Indo-Chine, 1936, p. 151; Pope, Rept. China, 1935, p. 187; Prater, J. Bombay N. H. S. xxx, 1924, p. 168; Fraser, ibid. xxxix, 1937, p. 473.—*Ophites aulicus*, Wall, Sn. Ceylon, 1921, p. 151, and J. Bombay N. H. S. xxix, 1923, p. 613, and Spol. Zeyl. xii, 1922, p. 257; Herklots, Hong Kong Nat. vi, 1935, p. 199; Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 155.

Lycodon capucinus Boie, 1827, Isis, p. 551 (based on Russell, ii, pl. xxxvii).

Lycodon unicolor Boie, 1827, Isis, p. 551 (based on Russell, ii, pl. xxxix).

Lycodon subfuscus Cantor, 1839, P. Z. S. p. 50 (Bengal: col. sketch in Bodleian Library).

Lycodon atropurpureus Cantor, l. c. s. p. 50 (Mergui, Tenasserim :

col. sketch in Bodleian Library) and Boulenger F B I 1890 p 336

Lycodon anomallense Günther 1864, Rept Brit Ind. p 313
Annamalai Hills (London) Boulenger F B I 1890, p. 293
and Cat Sn. Brit Mus 1, 1893 p 351 — *Ophites anomallense*
Wall, J Bombay N H S xix, 1893 p 613

Tyller's type & notes Theobald, 1868 Cat Rept Asia Soc.
Mus p 68 (Andaman Islands: Calcutta; in part)

Lycodon oculus cf *gouanense* Wall, 1909 J Bombay N H S xix,
p 62 (Cannanore & India)

Snout more or less spatulate and projecting beyond the lower jaw anterior and posterior nasals usually subequal,

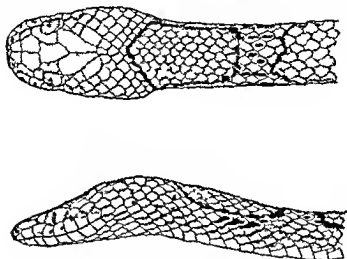


Fig 89 — *Lycodon oculus* x" (B.M. 1908 6.23 15)

loreal in good contact with the internasal not touching the eye 1 preocular temporals variable usually 2+3 9
supralabials anterior pair of genials a little larger than the posterior Scales in 17 17 15 rows smooth & 172 214
strongly angulate laterally C 57-60 A. 2

Hemipenis extending to the 10th caudal plate forked near the tip the distal $\frac{1}{2}$ is calyculate the calyces being transversely arranged the remainder of the organ has longitudinal folds which are beset with more or less distinct spines starting from the calyculate portion of the organ and extending about half way down, are two prominent folds composed of a number of short fleshy papillæ.

Two races can be distinguished :—

I. *Lycodon aulicus aulicus*.

Brown or greyish-brown above, with from 12–19 white cross-bars which expand laterally or bifurcate, enclosing triangular patches; the bars may be pure white or heavily speckled with brown; they are sometimes reduced to short vertebral spots; a triangular whitish blotch on each side of the occiput, or the two confluent with one another, usually present; upper lip white or spotted with brown.

Ceylon; India; Nepal; Assam; Burma, north of lat. 17°.

II. *Lycodon aulicus capucinus*.

Brown or purplish-brown above, with more or less distinct fine white or yellow reticulations; a whitish blotch on the occiput as in I; labials white, some or all of them with a brown spot. The light reticulations are occasionally confined to the interstitial skin, so that the snake looks at first sight uniform brown.

Burma south of lat. 24°; Siam; Southern French Indo-China; Hong Kong; The Andaman and Nicobar Islands.

In occasional individuals of both forms the white markings are lost entirely so that the specimen is uniform brown above, white below (*unicolor* Boie).

In hatchlings from the Andaman Islands the reticulated pattern is very conspicuous, the light colour being much more widely distributed; the adult is uniform brown above, except for a slight reticulation on the forepart of the body.

Range of the species: Ceylon; the Maldive Is.; the whole of India, extending west to Sind and north to the Himalayas (Kangra district, Nepal, Sikkim); the whole of Indo-China; Hong Kong; Southern China; the Malay Peninsula and Archipelago, as far south as Timor; the Andaman and Nicobar Is.; Celebes and the Philippines; Mauritius (introduced).

Total length: ♂ 760, tail 145; ♀ 700, tail 120 mm.

The commonest and most widely distributed of all the Wolf Snakes. Its fondness for entering and living in human habitations and the liability of being transported in cargoes has, no doubt, aided its dispersal. From 3 to 11 eggs are laid at a time, and possibly it breeds twice during the year. Wall, writing of Indian specimens, records that he has examined gravid females in all the first seven months of the year; the eggs were laid in the months from February to July, and "after mating, the pair do not dissolve partnership for a long time, if they do so at all." In Spol. Zeyl. (1922) he records finding a gravid individual in November. Herklots (1935) writing from Hong-kong records a female that laid 4 eggs on August 19, which were hatched out on September 23 (35 days later). During that time the female "was nearly

always observed to be curled on top of them." The young when born measure from 140-180 mm in length.

Geckos seem to form the main part of its food. Other lizards particularly *Scinks* come next, mice and frogs have also been recorded as part of its diet.

I have placed *L. subfuscus* and *L. atropurpureus* both of Cantor in the synonymy of this species. The sketch of *subfuscus* is a good illustration of Var I of this snake, that of *atropurpureus* of Var II. The ventral counts 245 for *subfuscus* and 257 for *atropurpureus* may be an error no Oriental species of *Lycodon* having so high a ventral count. In his MS Cantor states that *L. atropurpureus* is very common on the Tenasserim coast and often enters houses.

Variation *L. anomalensis* appears to be an aberrant example of *L. nubicus* differing in having the loreal divided into an anterior and a posterior part and an undivided anal shield. Another specimen from the Wynaad (B.M. 74.4.29.938) has two loreals on one side but only one on the other. A specimen from Ceylon (B.M. vicinity of Candy) has an undivided anal.

186 *Lycodon fasciatus*

Ophites fasciatus Anderson, 1879 Anat. Zool. Res. W. Yunnan, p. 87 pl. lxxxvii, fig. 1 (Fouces [Fangs] Yunnan). Wall. J. Bombay N. H. S. xxix, 1903, p. 614. — *Lycodon fasciatus* Boulenger F. B. I., 1890, p. 95 and Cat. Sn. Brit. Mus. 1893, p. 243. Wall. & Evans, J. Bombay N. H. S. xii, 1900, p. 37. Evans, ibid. xvi, 1904, p. 169. Wall. ibid. xviii, 1906, pp. 274 and 779 and xx, 1911, p. 943, col. pl. and xxx, 1925, p. 812, and xxxi, 1926, p. 56. Schmidt Bull. Amer. Mus. Nat. Hist. iv, 1907, p. 823; Foyat, Rept. China, 1905, p. 189. Bourret, Serp. Indo-Chine 1936, p. 155. Shaw & others, J. Darjeeling N. H. S. xi, 1932, p. 156.

Snout projecting beyond the lower jaw, posterior nasal larger than the anterior. Loreal touching the eye well separated from the internasal. Temporals 2+3. 8 supralabials. Scales in 17-19 rows the outer smooth the median 5-7 rows feebly but distinctly keeled. V 197-220 feebly angulate laterally. C 69-94. A. 1.

Hemipenis extending to the 8th caudal plate. It is spinose throughout the spines being small and closely set except at the proximal end, where they are much larger and fewer in number. The sulcus edges are strongly raised and spinose.

Black or purplish black above with yellowish cross-bars of irregular outline 25 to 42 in number on the body best marked anteriorly. In the young the dark colour of the back extends round the body forming complete annuli. In the adult these are incomplete. Belly blotched and powdered with black. Under part of the head white in the young. In the adult the light cross-bars have a dark median stippling.

Two specimens in the Natural History Museum, Paris, from S.E. Tibet, exact locality unknown, have 46 and 49 cross-bars on the body respectively.

Total length: ♂ 850, tail 170 mm. (934 mm., Wall).

Range. The Eastern Himalayas; Assam; S.E. Tibet; Burma; Siam (Tawkawbee, 9 miles S. of Umi Pang, lat. 16° N., long. 98° 75' E.); Yunnan; Upper Laos; W. China.

Apparently not uncommon in the hilly districts of Assam and Upper Burma.

A hill species found at altitudes ranging from 3,000 to 7,000 feet, usually in bushes or trees. The eggs vary in number from 4 to 14. Its food consists chiefly of lizards and snakes.

187. *Lycodon paucifasciatus* Rendahl, sp. nov.

Internasals $\frac{1}{3}$ the length of the prefrontals; a preocular; temporals 2+3; 8 supralabials. Scales in 19 rows, the seven median rows keeled at mid-body. V. 219, distinctly angulate laterally; C. 90.

Black above, with whitish annuli of irregular outline, 14 on the body and 8 on the tail; below whitish with greyish variegations, best marked on the hinder part of the body and tail; a white bar across the hinder part of the head.

Total length: 763 mm.

This new species, which differs from all other members of the genus in having 19 scale rows, was described to me by letter by Prof. Rendahl of the Naturhistoriska Rijksmuseum, Stockholm.

It is from Thua Lun, Annam, 50 km. south of Hué.

Genus CERCASPIS.

Cercaspis Wagler, 1830, Syst. Amph. p. 191 (type *Hurria carinatus* Kuhl); Dum. & Bib., Erp. Gen. vii, 1854, p. 390; Günther, Rept. Brit. Ind. 1864, p. 323; Wall, Spol. Zeyl. xi, 1921, p. 404.

Lycodon, Boulenger, F. B. I. 1890, p. 291.

Dentition and general appearance as in *Lycodon*, but differing in the following characters:—Scales in 19 rows, strongly keeled; subcaudals single; prezygapophyses of the dorsal vertebræ extended and forming strong lateral expansions; neural spines expanded and divided into two by a longitudinal groove* (fig. 90).

The strongly dilated prezygapophyses of the vertebræ can be readily felt, without dissection, as a ridge along each side of the back.

A single species.

Wall was the first to point out (1921) the unusual character of the vertebræ of this snake.

* Found also in the S. American *Xenopholis*.

188 *Cercaspis carinatus*.

Hemia carinata Kuhl, 1820, Beitr Zool Vergl Anat p 95 (no type loc given)—*Cercaspis carinatus*, Günther, Rept Brit Ind. 1864 p 324, Wall, Spol. 7 eyl. xi, 1921, pp 399, 404, and xiii 1924 p 77, and Sn Ceylon, 1921, p 162, and J Bombay N H S xxix 1923, p 614—*Lycodon carinatus* Boulenger, F B I 1890, p 297, and Cat Sn. Brit Mus i, 1893, p 358

Head elongate, depressed, snout broad; nostril between two nasals, the anterior smaller than the posterior, loreal

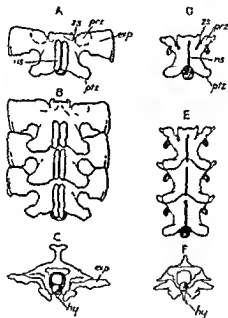


Fig 90—A B Dorsal and C Venter, view of vertebrae of *Cercaspis carinatus* D E and F Same of *Lycodon colicus*

exp, expansion of prezygapophysis; hy, hypapophysis, ns, nasal spine; prz, prezygapophysis, ptz, postzygapophysis, ns, tygoepheane

elongate, separated from the internasal and the eye; 1 pre- and 2 postoculars, temporals 2+2 or 2+3, 8 or 9 supra-labials, 3rd, 4th and 5th touching the eye, anterior pair of genuals as long as, or longer than, the posterior; scales in 17 or 19-17 rows, strongly keeled except the outermost row, which is feebly keeled. V. 185-202, with a strong lateral keel, C 51-64, A 1

Hemipenis extending to the 10th caudal plate, transversely flounced in its distal part, spinose in the remainder; the spines are comparatively thick and short, the largest ones being opposite the sulcus.

Black with whitish or pale yellow annuli; these are much narrower upon the back than upon the belly, and are usually broader in the young than in the adult; in a fully-grown specimen from Punduloya, the dorsal bars have disappeared completely; hinder part of the head white in the young.

Total length: ♂ 730, tail 125 mm.

Range. Ceylon. Found in the low country and in the hills up to 4,000 feet altitude. A common snake at Hopwell Estate, Balangoda district.

Genus DINODON.

Dinodon Dum. & Bib. 1853, Mem. Acad. Sci. Paris, xxiii, p. 463, and Erp. Gen. vii, 1854, p. 447 (type *cancellatum*=*rufozonatum*); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 360; Stejneger, Herp. Japan, 1907, p. 356; Wall, J. Bombay N. H. S. xxix, 1923, p. 615; Pope, Rept. China, 1935, p. 197; Bourret, Serp. Indo-Chine, 1936, p. 158; Werner, Zool. Jahrb. Syst. lvi, 1929, p. 58.

Eumesodon Cope, 1860, Proc. Acad. Nat. Sci. Philad. xii, p. 262 (type *semicarinatus*).

Lepidocephalus (not of Bleeker, 1858) Hallowell, 1860, Proc. Acad. Nat. Sci. Philad. xii, p. 498 (same type).

Adiaestema Werner, 1925, Sitz. Ber. Akad. Wiss. Wien, cxxxiv, p. 54 (type *cervinum*).

Lycodon (in part), Boulenger, F. B. I. 1890, p. 291.

Maxillary bone extending beyond the palatine, bent inwards but not arched, or only slightly, with 5-7 anterior teeth increasing in size, fang-like, and separated, or not, by a toothless space from the rest, 5 or 6 in number, the last 2 or 3 of which are larger than the others. Head not or but slightly distinct from neck; eye moderate with vertically elliptic pupil; body elongate; scales in 17:17(19):15 rows, smooth or feebly keeled, with apical pits; ventrals with or without a lateral keel; tail long; subcaudals paired. Hypapophyses absent on the posterior dorsal vertebrae.

Common characters, unless otherwise stated: Head elongate, depressed; nostril between 2 nasals; diameter of the eye equal to, or greater than, its distance from the mouth; internasals much shorter than the prefrontals; loreal elongate; 1 pre- and 2 postoculars; temporals 2+2 or 2+3; 8 supralabials, 3rd, 4th and 5th touching the eye.

Range. The Eastern Himalayas as far west as Sikkim; Indo-China as far south as lat. 16° N.; China; Japan.

Eight or 9 species are known.

For the affinities of the genus see p. 256.

Key to the Species.

- Body with white annals of irregular outline *gammiei* p. 271
 27 to 33 light : rose-bars on the back *septentrionalis*, p. 270
 85 to 95 light cross bars on the back *flaviconatus*, p. 271

189 *Dinodon septentrionalis*

- Ophites septentrionalis* Günther, 1875 F Z S p. 232 (E. Himalayas or Khasi Hills London).—*Lygodon septentrionalis*, Boulenger, F B L. 1890 p. 295.—*Dinodon septentrionalis* Boulenger, Cat. Fish Brit Mus L. 1893, p. 383 (in part), and iii, 1896, p. 612, and Ann. Mus. Civ. Genova (5) xii, 1892, p. 324, and J. Bombay N. H. S. xvi, 1903, p. 235, Wall, ibid. xviii, 1908, p. 778, and xxix, 1923, p. 813, and Rec. Ind. Mus. 1909 p. 146. Angel Bull. Mus. H. N. Paris, 1929, p. 79, Bourret, Serp. Indo-Chine, 1936, p. 162. Shaw & others, J. Daryelung N. H. Soc. xiii, 1939, p. 159.
Dinodon septentrionale chapaense Angel & Bourret, 1933, Bull. Soc. Zool. France [viii], p. 129 (Chapa, Tong King, Paris); Bourret, Serp. Indo-Chine 1936, p. 164.

Posterior nasal larger than the anterior; loreal sometimes very small, well separated from the internasal and the eye,

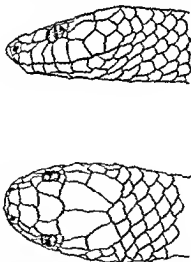


Fig. 91.—*Dinodon septentrionalis* (B.M. 1908 6.23 101)

scales smooth or the median 5-7 rows feebly keeled. V. 207-217, angulate laterally; C 81-92; A. 1.

Hemipenis undivided, extending to the 10th caudal plate. Calyculate and spinous throughout, the calyces being small, with a minute spine at each corner. At the extreme tip of the

organ the calyces are larger, and extending the whole length are six prominent folds, two of which border the suleus.

Purplish black above and on the sides, with narrow, white, transverse bars, 25-35 in number on the body, which expand laterally; on the forepart of the body the bars are about twice as far apart from one another as on the hinder part; lower parts white, sometimes spotted or barred with black, these markings being a continuation of the dark colour on the back; tail heavily marked with black below; hinder part of head white in the young, usually black in the adult.

Total length: ♀ 1180, tail 190 mm.

Range. The Eastern Himalayas (Darjeeling district); Assam; Burma; Siam as far south as Chiangmai; Upper Laos (Chieng-Kuang); Tong-King (Chapa, Ngan-Son).

190. *Dinodon gammiei*.

Ophites gammiei Blanford, 1878, J. A. S. Bengal, xlvii, p. 130 (Cinchona plain, Darjeeling; Calcutta).—*Lycodon gammiei*, Boulenger, F. B. I. 1890, p. 296, and Cat. Sn. Brit. Mus. i, 1893, p. 358; Slater, List. Sn. Ind. Mus. 1891, p. 15.—*Dinodon gammiei*, Wall, J. Bombay N. H. S. xxix, 1923, p. 615. *Lycodon fasciatus* (not of Blanford), D'Abreu, J. Bombay N. H. S. 1911, xx, p. 857, and xxi, 1912, p. 1335, fig. head.

Like *D. septentrionalis* in general scalation. V. 206-214; C. 94-104; A. 1.

Hemipenis extending to the 10th caudal plate; the anterior half is calyculate, the calyces being small with a minute spine at each angle; the proximal part of the organ is provided with large coarse spines; parallel with the suleus and separated from it by a short distance are two folds.

Body with alternating black and light greenish-yellow rings with very irregular margins, 28 to 36+15 or 16 in number; head black with light spots on most of the shields; a large light spot on each side of the posterior part of the head.

Total length: ♂ 1150, tail 290 mm.

Range. Sikkim and Darjeeling district.

Four specimens are known.

As pointed out by Wall, the type has 17 scales on the neck and 19 at the middle of the body.

191. *Dinodon flavozonatus*.

Dinodon flavozonatum Pope, 1928, Amer. Mus. Novitat. No. 325, p. 2 (Chungan Hsien, Fukien Province: New York), and Rept. China, 1935, p. 198, fig.; Smith, Rec. Ind. Mus. xlii, 1940, p. 482.

Dinodon rufozonatum meridionale Bourret, 1935, Bull. Gen. Instr. Pub. Hanoi, March, p. 241 (Chapa, Tong-King: Paris), and Serp. Indo-Chine, 1936, p. 161.

Posterior nasal larger than the anterior; loreal well separated from the internasal and the eye; scales of the median

10-12 rows feebly keeled V 225-240, with a distinct lateral keel C. 85-99 A 2

Hemipenis extending to the 13th caudal plate not forked, the distal $\frac{1}{2}$ of the organ has smooth longitudinal folds, the middle $\frac{1}{2}$ is calcareate the cups being extremely small, and in general arranged so closely together that they present a sponge like appearance, the edges of the cups are spinose, this area merges gradually into a spinose one the spines gradually increasing in size as they approach the base of the organ the *sileus* lips are formed by two thick folds which are spinose like the parts adjacent to them

Black above with light (yellow in life) narrow cross-bars 85 to 95 in number on the body, which bifurcate on the sides enclosing dark spots, white below (yellow in life) with large black spots these are subquadrangular in shape in the middle of the ventrals and more rounded on the outer margins, head black with symmetrical light markings the most conspicuous being one from the eye to the angle of the mouth and another parallel with it starting from the hinder margin of the parietal, labials edged with black

Total length ♂ 1440 tail 270, ♀ 1210, tail 220 mm

Range Mr Ronald Kaulback obtained 5 specimens in the Nam Tama Valley, north of the Triangle Upper Burma. Elsewhere it is known from Tong King and Western China.

Genus DRYOCALAMUS

Nymphis (non Martins 1774) Fitzinger 1826 *Neue Class. Rept.* p. 29 (type *Coluber nymphis* Daudin)

Odononotus (non Kirby 1837) Dum. & Bb., 1853, *Mem. Acad. Sci. Paris*, xxii, p. 463 (type *nymphis*)

Dryocalamus Günther 1858 *Cat. Col. Sn. Brit. Mus.* p. 121 (type *tristegans*); Boulenger *Cat. Sn. Brit. Mus.* i. 1893 p. 369

Hydrophobus Günther 1862, *Ann. Mag. Nat. Hist.* (3) ix. p. 127 (type *semifasciatus*); Boulenger *F. B. I.* 1890 p. 297

Ampyphodius Günther 1864, *Rept. Brit. Ind.* p. 235 (type *maculatus = subannulatus*)

Urops Blanford, 1878, *J. A. S. Bengal*, xiv, p. 129 (type *discolor*).

Maxillary bone bent inwards and extending well beyond the palatine with from 8 to 10 teeth increasing in size posteriorly Head not very distinct from neck, eye large, with vertically elliptic pupil, scales in 13 or 15 rows throughout, with apical pits tail moderate, subcaudals paired Hypapophyses absent on the posterior dorsal vertebrae

Common characters unless otherwise stated — Head sub-ovate when viewed from above, depressed, eye large or very large its diameter usually much greater than its distance from the mouth rostral broader than high, internasals a little shorter than the prefrontals, loreal elongate, anterior par-

of genials longer than the posterior ; scales smooth ; ventrals strongly angulate laterally.

The general reduction in scalation is shown in the number round the body, the union of the nasals, the union of the loreal with the preocular and the number of labials.

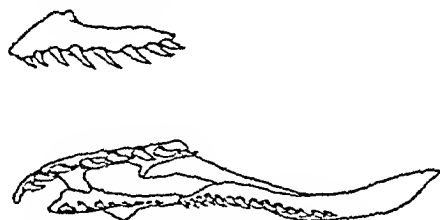


Fig. 92.—Maxilla and palato-maxillary arch of *Dryocalamus davisoni*.

Range. India ; Indo-China ; the Malayan region ; the Philippines.

Five species are known.

A genus of small snakes, of gentle disposition and nocturnal habits. They are good climbers.

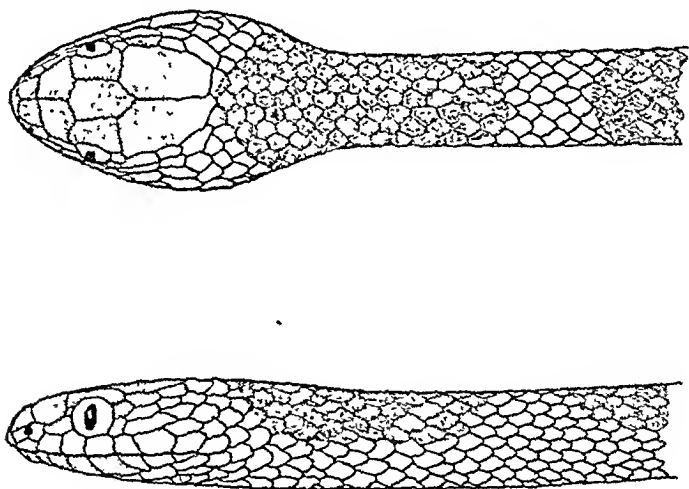


Fig. 93.—*Dryocalamus nympha*. (B.M. 92.11.3.4.)

Key to the Species.

Scales in 13 rows ; 1-2 preoculars	<i>nympha</i> , p. 274.
Scales in 13 rows ; no preocular	<i>davisoni</i> , p. 274.
Scales in 15 rows ; 1 preocular	<i>gracilis</i> , p. 275.

192 *Dryocalamus nympha*.

BRIDAL SNAKE

- Russell, Ind Serp 1, 1796, pp 42, 43 pls xxxvi & xxxvii (Vellore, London)
Coluber nympha Daudin, 1803, Hist Nat Rep vi, p 241, pl lxxv, fig 1 (based on Russell's pls.)—*Odontomus nympha* Günther, Rept Brit Ind 1864, p 233—*Hydrophobus nympha*, Boulenger, F B I 1890, p 298—*Dryocalamus nympha* Boulenger Cat Sn Brit Mus 1, 1893, p 370, Wall, J Bombay N H 8 xix, 1909 p 287, col pl and xxix, 1923 p 616, and bpol Zeyl. 1921, p 399, and Sn Ceylon, 1921, p 168
Hydrophobus semifasciatus Günther, 1862, Ann. Mag Nat Hist (3) ix, p 127, pl ix, fig 6 (type loc unknown London)—*Odontomus semifasciatus* Günther, Rept Brit Ind 1864, p 234
Dryocalamus nympha var *ceylonensis* F Müller, 1887, Verh. Nat Ges Basel viii, p 269

Nostril in an undivided nasal, or with a suture extending from it to the first labial, loreal in contact with the eye or separated from it by a minute preocular, with a larger one above it, 2 postoculars, temporals 2+2, 6 or 7 supralabials, 3rd and 4th touching the eye Scales in 13 rows V 200-236, C 65-88, A 2

Hemipenis extending to the 10th caudal plate, the distal half is strongly flounced, the proximal has large spines arranged in longitudinal series, the line of demarcation between the two being well defined.

Dark brown or black above and on the sides, with white or yellowish cross bars expanding laterally, each bar on the back occupies 3 or 4 scales and is spotted with black, on the hinder part of the body they are often broken up, forming spots on the sides, upper lip, hinder part of head and nape and lower parts, uniform white

Total length ♂ 460, tail 90 mm (520, Wall)

Range Ceylon and Southern India as far north as lat 12° 30' on the Western side, and Orissa on the Eastern (Wall)

Found in the plains and in the hills at low altitudes, often entering houses

Russell's types, two in number, are in the British Museum They are now somewhat faded, but are otherwise in an excellent state of preservation

193 *Dryocalamus davisoni*.

- Urops davisoni* Blandford, 1878, J A S Bengal, xii, p 128 (Nawlabu Hill, E of Tavoy Calcutta), and P Z S 1881 p 221—*Hydrophobus davisoni*, Boulenger, F B I 1890 p 299—*Dryocalamus davisoni*, Boulenger, Cat Sn Brit Mus 1, 1893, p 372, Wall J Bombay N H 8 xix 1923 p 616, Smith, J Nat Hist Soc Siam, i, 1914, p 93, Bourret, Serp Indo-China, 1936, p 168

Nostril in an undivided nasal, loreal in broad contact with

the eye; no preocular; 1-2 postoculars; temporals 1+2 or 2+2; 7 supralabials, 3rd and 4th touching the eye; scales in 13 rows. V. 233-255; C. 90-108; A. 1.

Hemipenis as in *nympha*.

Black above and on the sides, with white or pale green, irregular cross-bars, expanding laterally; anteriorly each bar occupies 2-4 scales; on the hinder part of the body they are narrower, closer together and often broken up so that the pattern becomes more or less reticulate; hinder part of head white with a dark median stripe; upper lip and lower parts white; tail heavily speckled with black. In the adult the white cross-bars often have a median stippling of brown.

Total length: ♂ 920, tail 205 mm.

Range. Siam between lats. 18° and 11° N.; Tenasserim (Tavoy); Burma (Rangoon); Cambodia; Cochin China; Southern Annam.

Found in the lowlands. A captive specimen in Bangkok laid 4 eggs on May 31. They were very elongate, measuring 35×9 mm. in size. Two young hatched out on August 10, and measured 250 mm. in length. Another individual caught in September contained 3 eggs.

194. *Dryocalamus gracilis*.

Odontomus gracilis Günther, 1864, Rept. Brit. Ind. p. 234 (Anamallays: London).—*Hydrophobus gracilis*, Boulenger, F. B. I. 1890, p. 298.—*Dryocalamus gracilis*, Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 371; Wall, J. Bombay N. H. S. xix, 1909, p. 290, fig. head, and Sn. Ceylon, 1921, p. 169, and J. Bombay N. H. S. xxix, 1923, p. 616.

Odontomus fergusonii Haly, 1888, Taprobanian, iii, p. 51 (Ceylon).

Nasal shield more or less divided into an anterior and posterior part; loreal in broad contact with the eye, with a small preocular above it, rarely absent; 2 or 3 postoculars; temporals 2+2 or 2+3; 7 supralabials, 3rd and 4th touching the eye. Scales in 15 rows throughout. V. 199-243; C. 75-87; A. 1, rarely 2.

Hemipenis and coloration as in *nympha*.

Total length: ♂ 520, tail 110 mm. (620, Wall.)

Range. Peninsular India (Anaimalais, Cuddapah Hills, Berhampore in Orissa); False I., off the coast of Arakan; Ceylon.

A rare species.

Genus **SIBYNOPHIS**

Sibynophis Fitzinger 1843 Brit Rept p 26 (type *Hoplocheilus*
gemmatus) Stejneger Proc U.S. Nat Mus xxxvii, 1910,
 p 102 Pope Rept China, 1935 p 81. Bourret, Serp. Indo-
 Chine 1938, p 42
Polyodontophis Boulenger 1890, P B I p 301 and Cat Sn.
 Brit Mus i, 1893, p 161. Wall, Sn. Ceylon, 1921, p 82

Teeth very numerous and closely set, equal in size, bayonet-shaped 30 to 50 in each maxilla, dentary bone completely detached from the articular posteriorly Head slightly distinct from neck, eye rather large, with round pupil. Body cylindrical scales smooth, in 17 rows throughout in all the Oriental species, ventrals rounded, subcaudals paired Hypapophyses developed throughout the vertebral column

Common characters, unless otherwise stated — Rostral broader than high frontal distinctly longer than its distance from the end of the snout, nostril between two nasals, internasals shorter than the prefrontals, 1 pre- and 2 postoculars genials subequal in size or the anterior pair slightly longer in contact with 4 infralabials, anal divided

Range The Oriental Region, Madagascar, Central America Seven species in the Oriental Region

A genus of hill snakes, oviparous, laying from 2 to 4 eggs at a time

The 6 species here described are very closely related to one another, the diagnostic characters between them, apart from coloration, being found chiefly in the scales of the temporal region.

Key to the Species

- I. Subcaudals 95 or more
 - 1 anterior temporal, in contact with the 8th labial 10 supralabials *collaris* p. 277
 - 2 anterior temporals, the lower touching the 7th and 8th labials, 9 supralabials *chinensis* p. 278
- II. Subcaudals less than 80
 - A Normally 2 anterior temporals
 - 9 supralabials parietal touches both postoculars no black stripe along the side of the body *subpunctatus* p. 279
 - 9 supralabials parietal touches both postoculars a black stripe along the side of the body *heterogobius*, p. 278
 - 8 or 9 labials parietal touches upper postocular only *[grahamii]* p. 280
 - B Normally 1 anterior temporal
 - 7 or 8 supralabials, parietal touches both postoculars *agutatus*, p. 280.

195. *Sibynophis collaris**.

Psammophis collaris Gray, 1853, Ann. Mag. Nat. Hist. (2) xii, p. 390 (Khasi Hills; London).—*Polyodontophis collaris*, Boulenger, F. B. I. 1890, p. 302, and Cat. Sn. Brit. Mus. i, 1893, p. 184, pl. xii (in part); Annandale, Rec. Ind. Mus. viii, 1912, p. 46; Wall, J. Bombay N. H. S. xviii, 1908, p. 316, and xix, 1909, pp. 340, 757, and xxix, 1923, p. 598; Fraser, ibid. xxxix, 1937, p. 498.—*Ablabes collaris*, Stoliczka, J. A. S. Bengal, xl, 1871, p. 430.—*Sibynophis collaris*, Smith, Bull. Raffles Mus. no. 3, 1930, p. 40, and Rec. Ind. Mus. xlii, 1940, p. 482; Pope, Rept. China, 1935, p. 86, fig. head; Bourret, Serp. Indo-Chine, 1936, p. 43 (in part); Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 115.

Loreal squarish or a little longer than high; 10, rarely 9

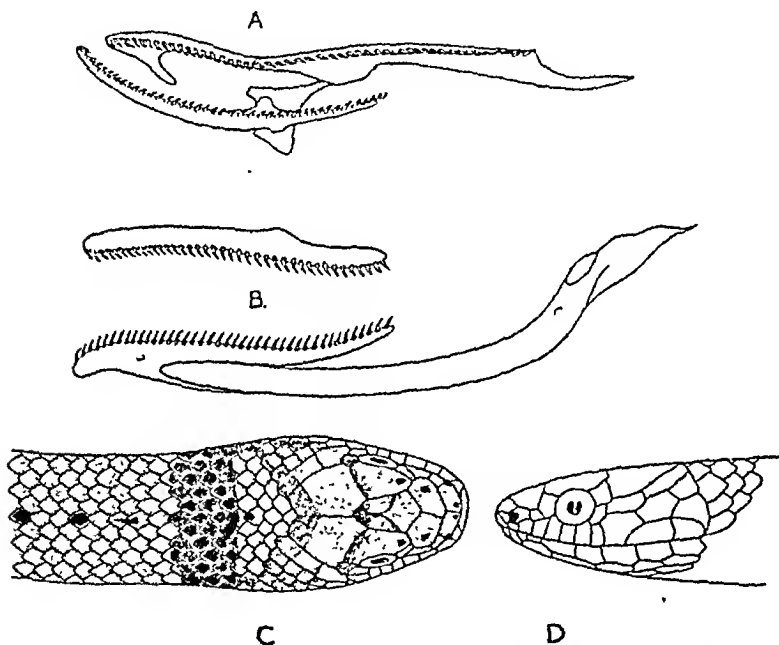


Fig. 94.—*Sibynophis collaris*. A. Palato-maxillary arch. B. Maxilla and mandible. C. Dorsal, and D. Lateral view of head.

or 11 supralabials, 4th to 6th touching the eye; 1 anterior temporal, in contact with the 8th labial; parietal touches upper preocular only, or is just in contact with the lower. V. 155-186; C. 100-125.

* Selater, List Sn. Ind. Mus. 1891, p. 17, has referred *Coluber colubrinus* Blyth? to the synonymy of this species. I am unable to find the original description in any of Blyth's papers.

The hemipenis extends to the 9th caudal plate and is not forked the distal $\frac{1}{2}$ is calyculate, the calyces being small and with scalloped edges the proximal $\frac{1}{2}$ is spinose the spines gradually increasing in size those at the base of the organ being very large In addition the spinose area near the sulcus is divided into two for a short distance by an extension of the calyculate area Pope has stated that the hemipenes of *collaris* and *chinensis* differ from one another the material at my disposal does not confirm his view

Brown above usually with a vertebral series of small black spots head with small black spots or vermiculations and two black transverse bars one behind the eyes the other across the occiput nape black bordered with yellow behind upper lip white or yellow spotted and bordered above with black Lower parts yellowish each ventral shield with an outer black spot or streak anterior ventrals with a pair of median dots in addition

Specimens from Siam and Annam may have a lateral series of yellow spots on scale-rows 4 or 5 and the yellow border on the nape may be chevron shaped the apex pointing backwards

Total length 760 tail 235 mm (♀) Males are smaller

Range The Himalayas as far west as Simla Assam north to the Mowmi Hills Western Yunnan Laos the whole of Burma and the hilly country of Siam Annam (the Langban Plateau and hills W of Hue) Koh Chang in the Gulf of Bangkok Cunong Tahan Lahang in the Malay Peninsula

Fairly common in the Eastern Himalayas and Assam ascending to an altitude of 10 000 feet Its chief food appears to be lizards mainly scinks Wall records finding a snake's tail in the stomach of one individual Mutilated tails are frequent in this species

196 *Sibynophis chinensis*

Atractus chinensis Günther 1859 Ann Mag Nat Hist (6) iv p 270 (Ichang Hupeh London) — *Sibynophis chinensis* Pope Rept China, 1932 p 8* fig head.

Sibynophis collaris sinensis Bourcet 1836 Serp Indo Chine. p 44

Sibynophis hainanensis Schmidt 1925 Amer Mus Nov no 157 (Nodda, Hainan New York)

Similar to *collaris* but with two anterior temporals the lower in contact with the 7th and 8th labials usually only 8 supralabials V 168-183 C 98-122

Light brown above the vertebral series of scales grey with or without small black spots head markings as in *collaris* but less distinct

Range Tong King Hainan, S China to Formosa

197. *Sibynophis subpunctatus*.

Oligodon subpunctatus Dum. & Bibr. 1854, Erp. Gen. vii, p. 58 (Malabar; Paris).—*Polyodontophis subpunctatus*, Boulenger, F. B. I. 1890, p. 313, and Cat. Sn. Brit. Mus. i, 1893, p. 186; Wall, Sn. Ceylon, 1921, p. 84, fig. head, and J. Bombay N. H. S. xvii, 1907, p. 323, and xxix, 1923, p. 599; Prater, ibid. xxx, 1924, p. 168; Fraser, ibid. xxxix, 1937, p. 470.—*Sibynophis subpunctatus*, Schmidt, Pub. Field Mus. N. H. xii, 1926, p. 171. *Oligodon spinæpunctatus* Jan, 1862, Arch. Zool. Anat. Phys. ii, p. 40 (probably Bangalore; Basel). *Enicognathus humberti* Jan, 1863, l. c. s. p. 275, and Icon. Gen. xvi, 1866, pl. iv, fig. 1 (Ceylon; Genoa; not seen by me).

Loreal small, longer than high; 9 (rarely 8) supralabials, 4th to 6th (or 3rd to 5th) touching the eye; 2 anterior temporals, the lower wedged in between 7th and 8th (or 6th and 7th) labials; parietal touches both postoculars. V. 157–200 (Ceylon and India, south of Lat. 14°); V. 172–215 (India north of Lat. 18°, Matheran, Nasik dist.; C.P.; Bengal); C. ♂, 60–76; ♀, 54–63.

The hemipenis extends to 8th or 9th caudal plate and is not forked; the distal $\frac{1}{3}$ is calyculate, the calyces having scalloped edges; the proximal $\frac{2}{3}$ is spinose, the spines being of almost uniform size and arranged in longitudinal series; from near the base of the organ to near the tip, and in a position almost opposite the sulcus, are two rows of large spines.

Light brown above, with a vertebral series of black dots; sides of the body often grey, the colour bounded above by a dark line or series of dark spots; head and nape dark brown or black; lips yellow, uniform in specimens from Ceylon, usually spotted in those from India; a yellow transverse bar between the eyes and two broad ones bordering the dark colour of the nape; the dark colour extends forwards bisecting the yellow; yellow below, each ventral shield with a black dot near its outer border.

Total length: 460, tail 100 mm. (♀).

Range. As given in the ventral counts.

198. *Sibynophis bistrigatus*.

Ablabes bistrigatus Günther, 1868, Ann. Mag. Nat. Hist. (4) i, p. 417, and Thobald, J. Linn. Soc. x, 1868, p. 42 (Pegu; London).—*Polyodontophis bistrigatus*, Boulenger, F. B. I. 1890, p. 304, and Cat. Sn. Brit. Mus. i, 1893, p. 188; Wall, J. Bombay N. H. S. xxix, 1923, p. 600.

Like *subpunctatus* in scalation, but of different colour pattern and smaller size.

V. 184–186; C. 73–75.

Hemipenis as in *subpunctatus*.

Light reddish brown above, with a vertebral series of black spots, and a conspicuous black stripe along each side of the

body and tail on scale-rows 4 and 5. top of the head and nape black the dark colour of the former bordered on each side with yellow lips yellow a pair of yellow spots on the neck lower parts uniform yellow

Total length 300 tail 80 mm (♀)

Range Burma (Prome, Pegu) As noted by Wall (1923), Roepstorff's specimen said to have come from Camorta, in the Nicobars needs confirmation

A rare snake known from a few specimens only

199 [*Sibynophis grahami* L.]

Polyodontophis grahami Boulenger 1904, Ann. Mag. Nat. Hist. (7) xiii, p. 132 (between Yunnan Fu and Kuitang, Yunnan London) — *Sibynophis grahami*, Pope, Rept. China, 1933, p. 88, fig. head

Range The Yunnan plateau

200 *Sibynophis asgittarius*

Calamaria asgittaria Cantor 1839 F. Z. S. p. 49 (Tibet B and O London sketch in Bodleian Lib.) — *Polyodontophis asgittarius* Boulenger F. B. I. 1890 p. 303 and Cat. Sn. Brit. Mus., 1893 p. 187 Wall, J. Bombay N. H. S. xvii, 1907 p. 87, and xix, 1923 p. 899
Enicognathus grayi Jan. 1863, Arch. Zool. Anat. Phys. ii, p. 274 and Icon. Gen. xvi, 1866 pl. iii, fig. 3 (Himalayas Milan; not seen by me)
Enicognathus braconieri Jan. 1863 l. cc p. 274, and xvi pl. 6 (type loc. unknown; Wasmöden; not seen by me)

Snout broader and more rounded and frontal broader than in the preceding species, loreal small or very small often absent, entirely united with the prefrontal or the posterior nasal, 7 or 8 supralabials, 3rd and 4th, or 3rd, 4th, and 5th touching the eye, normally one large anterior temporal its lower margin wedged in between the 8th and 7th labials parietal touches both postoculars V 197-238, C 57-70

Light brown above with a vertebral series of black dots, greyish brown on the sides, the colour occupying four scale rows and bordered above with black, head and nape dark brown or black, with a large elongate oval patch of yellow on each side at the back of the head snout variegated with yellow a yellow border to the nuchal patch behind lips yellow spotted with black Lower parts yellow, with a black dot on the outer edge of each ventral shield.

There are two specimens in the British Museum, presented by Cantor one of which appears to be the type

Total length 305 tail 250 mm

Range North-eastern India from the Central and United Provinces to Eastern Bengal Wall records it from the Western Himalayas

Genus NATRIX.

- Natrix* Laurenti, 1768, Syn. Rept. p. 73 (type *N. vulgaris* = *Coluber natrix* Linn.); Wall, J. Bombay N. H. S. xxix, 1923, p. 600 (in part); Pope, Rept. China, 1935, p. 89; Bourret, Serp. Indochine, 1936, p. 54 (in part).
Tropidonotus Boie, 1826, Isis, p. 205 (type *natrix*); Boulenger, F. B. I. 1890, p. 341, and Cat. Sn. Brit. Mus. i, 1893, p. 192.
Rhabdophis Fitzinger, 1843, Syst. Rept. p. 27 (type *subminiatus*); Wall, l. c. s. p. 604; Bourret, l. c. s. p. 84.
Steiropphis Fitzinger, 1843, Syst. Rept. p. 27 (type *chrysargus*).
Nerodia Baird & Girard, 1853, Serp. N. Amer. p. 38 (type *sipedon*); Wall, l. c. s. p. 602.
Amphiesma Dum. & Bib., 1854, Erp. Gen. vii, p. 724 (type *stolatum*).
Herpetoreas Günther, 1860, P. Z. S. pp. 156, 257 (type *sieboldi* = *platyceps*).
Fowlea Theobald, 1868, Cat. Rept. Asiat. Soc. Mus. p. 57 (type *punctulata*).
Bothrodyles Cope, 1886, Pr. Amer. Phil. Soc. xxiii, p. 495 (type *subminiatus*).
Ceratophallus Cope, 1893, Amer. Nat. xxvii, p. 483 (type *vittata*).
Diplophallus Cope, l. c. s. (type *piscator*).

Maxillary teeth 18-35 (for the species included in this work), posterior longest; mandibular teeth subequal; head usually distinct from neck; eye moderate or large, with round pupil. Body more or less elongate, cylindrical; scales in 15-19 rows (for species in the Oriental Region), more or less distinctly keeled, rarely smooth, usually with apical pits; ventrals rounded. Tail moderate or long; subcaudals usually paired. Hypapophyses developed throughout the vertebral column.

Common characters unless otherwise stated:—Eye large, its diameter greater or distinctly greater than its distance from the border of the mouth; nostril in a semi-divided, or completely divided, nasal; internasals shorter than the prefrontals; frontal $1\frac{1}{2}$ to $1\frac{1}{2}$ times longer than broad, as long as or a little longer than its distance from the end of the snout; loreal squarish or a little longer than high; 3, rarely 2 or 4, postoculars; 5 infralabials in contact with the anterior genials, which are shorter than posterior; anal divided.

Hemipenis reaching to the 7th or 8th caudal plate, spinose and calyculate throughout, the spines being more or less uniform in size. The lips of the calyces are short or very short, the spines originating within the cup; at the base of the organ there are from 2-4 large or very large spines.

Range. Asia and the East Indian Islands; the north coast of Australia; Europe; Africa; North America. Some 80 species are known; 50 of which inhabit Asia and the Oriental Region.

I have maintained Boulenger's grouping of the species within the genus, as it presents the most ready means of identification. On the whole it is a fairly natural one although weakened by many exceptions. The extremes or end-forms

of each group are easily recognized, but there is no clear line of demarcation between them, one merging gradually into the other. *N. parallela* is a case in point. To overcome the difficulty, in some cases of ascertaining the type of dentition, and to facilitate identification, Boulenger supplemented his key with a table of the numbers of shields and scutes of the various species (Cat. Sn. 1, p. 193). I have adopted the same plan.

In the *Natrix* group the teeth form continuous series, in *Rhabdophis* there is usually an interval between the enlarged posterior teeth and those that immediately precede them, as a rule, the greater the enlargement of the teeth the longer the interval. In *N. stolata* there may or may not be an interval according to the individual, this species also combines the dentition of *Phabdophis* with the nasal characters of *Acerolis*. The *Natrix* type of dentition is the most primitive, *Rhabdophis*, a polyphyletic assemblage has been derived from it, and, in their turn, *Pseudacynodon*, *Macropisthodon*, and *Balanophis*.

I have examined the type of *Phayren scabellina* Theobald. Cat. Rept. Mus. Anat. Soc. Bengal, 1868, p. 51, said to have come from Bassein, Burma and regard it as conspecific with the South American *Lypophis lineatus* (Linn.).

The following species have been met with just within the limits of the area covered by this work, or just outside. They are entrants from other regions and do not properly belong to the Indian Indochinese fauna. The Chinese species have been dealt with by Pope (1935) and a full account of them will be found in his work. The two Malayan forms are referred to under *modesta*.

- Natrix aquilaerata* Barbour 1908 Bull. Mus. Comp. Zool. 6 p. 317. Pope Rept. China, 1935, p. 93 (Hainan and Southern China).
Natrix johannes Boulenger 1908, Ann. Mag. Nat. Hist. (8) ii, p. 211; Pope L. c. s. p. 106 (Yunnan and Western China).
Natrix scolineata Boulenger 1904, Ann. Mag. Nat. Hist. (7) xii, p. 132. Pope, L. c. s. p. 112 (Yunnan and Western China).
Natrix ornatocephala Werner 1924, Sitz. Ber. Akad. Wiss. Wien, cxxxix (1), p. 30. Pope, L. c. s. p. 114 (Hainan and Southern China).
 Greenitt Peking Nat. Hist. Bull. xv, 1941, p. 186 (Hainan).
Natrix popoi Schmidt 1935 Amer. Mus. Nov., no. 157, p. 3. Pope, L. c. s. p. 123 (Hainan and Southern China).
Natrix baileyi Wall, 1907, J. Bombay N. H. S. xvii, p. 617 and xix, 1923, p. 802 (above Gyantse, Tibet).
Natrix tessellata Boulenger Cat. Sn. Brit. Mus. 1, 1893, p. 233. Wall, J. Bombay N. H. S. xix, 1923, p. 604 (Europe and S. E. Asia; recently obtained at Dams Ghon, in N. Afghanistan, recorded by Wall from Mastuj N. Chitral Territory).
Natrix vici Laudlaw 1901, P. Z. S. p. 576 pl. xxxv, fig. 2, Smith. Bull. Raffles Mus. no. 3, 1930 p. 43.
Natrix groundwaters Smith, 1922, J. Nat. Hist. Soc. Siam, iv, p. 205 pl. 2, and L. c. s. 1930 p. 42 (Isthmus of Kra).

Key to the Species.

I. Posterior maxillary teeth gradually enlarged; internasals broadly truncate anteriorly; nostrils lateral (*Natrix*).

A. Scales in 15 or 17 rows.

A nuchal groove; V. 139-160 *nuchalis*, p. 284.

B. Scales in 17 rows; no nuchal groove.

V. 158-172; C. 117-140 *v. renningi*, p. 286.
V. 166-176; C. 84-106 *v. taronensis*, p. 286.
V. 118-126; C. 61-73; T. 1+2 *sauteri*, p. 287.
V. 129-146; C. 54-77; T. absent *atemporalis*, p. 287.

C. Scales in 19 rows; subcaudals paired or some of them single.

Maxillary teeth 20-24; 8 supralabials *parallela*, p. 288.
Maxillary teeth 25; 7 or 8 supralabials *nicobarensis*, p. 289.

Maxillary teeth 26-30; 9 supralabials.

a. Labials black with light centres *khasiensis*, p. 289.

b. Labials whitish, the margins edged with black, or almost entirely black or brown.

Maxillary teeth 19-21; 9 supralabials; anal entire *modesta*, p. 290.
..... *peali*, p. 291.

D. Subcaudals all single.

Maxillary teeth 22-23; 9 supralabials *xenura*, p. 292.

II. Posterior maxillary teeth gradually enlarged; internasals distinctly narrowed anteriorly; nostrils directed slightly upwards (*Nerodia*).

A. Scales in 17 rows.

Scales smooth *punctulata*, p. 292.

B. Scales in 19 rows, keeled.

a. 22-28, maxillary teeth; two oblique black stripes from the eye *piscator*, p. 293.

b. 30-34 maxillary teeth; no stripes from the eye.

2 anterior temporals; 3 labials touch the eye; V. 86-96 *trianguligera*, p. 296.

2 anterior temporals; 2 labials touch the eye; V. 70-85 *percarinata*, p. 299.

1 anterior temporal; 3 labials touch the eye. *bellula*, p. 298.

III. Last 2 or 3 maxillary teeth abruptly enlarged; internasals broadly truncate anteriorly; nostrils lateral (*Rhabdophis*).

A. A nuchal groove.

a. Scales in 15 rows.

Nuchal scales enlarged. V. 117-126; C. 39-46. *angeli*, p. 300.

b. Scales in 19 rows.

Nuchal scales (3 median rows) narrower than those adjacent to them; a dorso-lateral series of yellow spots: 2 labials touch the eye *himalayana*, p. 300.

Nuchal scales enlarged (in northern specimens); no dorso-lateral series of yellow spots; 3 labials touch the eye *subminiata*, p. 302.

B No nuchal gland or groove;
scales in 19 rows.

a Internasals much narrowed
anteriorly. 2 light stripes
down the back

b Internasals not markedly
narrowed anteriorly. no
light stripes down the back

molata, p. 303.

platycrope p. 305

19-21 maxillary teeth
c. More than 25 maxillary
teeth

addomae, p. 308.

neurocauda, p. 307

monocela, p. 308.

chryseris, p. 303

collechroma, p. 309

One anterior temporal C 83-85

One anterior temporal C 84-87

Two anterior temporals V 130-144

Two anterior temporals 8 supralabials, no
nuchal gland V 150-165

Two anterior temporals, 8 supralabials, a
nuchal gland. V 152-159

201 *Natrix nuchalis*

Tropidonotus nuchalis, var Günther, 1859, Ann Mag Nat. Hist.
(6) iv p. 221 (Ichang, China. London)

Tropidonotus nuchalis Boulenger, 1891, Ann. Mag. Nat. Hist.
(6) vii, p. 251 (based on Günther's specimens), and Cat. Fish.

Brit. Mus. L. 1893, p. 218, pl. xix, fig. 1. — *Natrix nuchalis*,
Parker Ann. Mag. Nat. Hist. (9) xv, 1895, p. 276. South.

Geogr. Journ. London 1892, p. 479 and p. 18 1893

p. 550 fig., and Rec. Ind. Mus. xli 1940, p. 492, Pope, Rept.

China, 1935 p. 108, fig. head.

Natrix leonardi Wall. 1923, J. Bombay N. H. 8 xix, pp. 488 &
602 (Simlun Kaba, N. Burma. London), and xix, 1925,

p. 803.

Natrix nuchalis Schmidt, 1923, Amer. Mus. Nov., no. 157, p. 2

(Sooch Wa Yunnan, New York)

Natrix nuchalis collaris Vogt, 1927, Zool. Anz. Leipzig, lxx. 11/12,

p. 283 (Yunnan)

Natrix nuchalis nuchalis and *N. n. leonardi* Bourret, 1936, Serp.

Indochine, pp. 56, 57

A nuchal gland (sacculated type), a nuchal groove, the scales
on each side of it more or less distinctly enlarged and paired
(fig. 8, p. 17) Maxillary teeth 18-23, gradually enlarged
posteriorly, nostrils lateral, internasals truncate anteriorly,
1 preocular, temporals 1+1 or 1+2; 6 supralabials, 3rd and
4th touching the eye, 5th longest, 4 infralabials touching the
anterior genials, which are broader but shorter than the
posterior. Body rather stout. Scales in 17, rarely 19, rows
on the neck, 15, rarely 17, at mid body, more or less distinctly
keeled except the outer row, which is smooth V 139-160.
C ♂ 52-65, ♀ 41-52

Hemipenis to the 11th-14th caudal plate, forked near the
tip

Olivaceous or greenish above, the scales sometimes edged
with black, an indistinct dorso-lateral chain of small yellow
spots sometimes present, pale greenish below, uniform, or

Table of Dental and Scale Counts.

Species.	Max. teeth.	So.	Vent.	Caud.	Lab.	Temp.
I. <i>nuchalis</i>	18-23	16	139-180	41-65	6 (3-4)	1
<i>venningi</i>	27-32	17	158-176	84-140	9 (4-6)	1
<i>sauteri</i>	22-24	17	118-126	61-73	7 (4-5)	1
<i>atemporalis</i>	28-30	17	129-146	54-77	6 (3-4)	Absent.
<i>parallola</i>	20-24	19	163-172	73-108	8 (3-6)	1
<i>nicobarensis</i>	26	19	160	120	7 or 8	1
<i>klasiensis</i>	20-28	19	145-155	94-110	9 (4-6)	1
<i>modesta</i>	28-32	19	148-168	83-132	9 (4-6)	1
<i>pedi</i>	19-21	19	142-144	75-77	9 (4-5)	2
<i>zenura</i>	22-23	19	158-165	82-105	9 (4-6)	2
<i>punctulata</i>	26-30	17	134-154	70-83	9 (4-5)	2
<i>piscator</i>	22-28	19	128-158	70-97	9 (4-5)	2
<i>trianguligera</i>	32-34	19	134-145	86-96	9 (4-5)	2
<i>percarinata</i>	30-34	19	133-147	70-85	9 (4-6)	2
<i>bellula</i>	32-34	19	139-144	78-83	9 (3-5)	1
III. <i>himalayana</i>	20-29	19	157-176	79-95	8 (4-5)	2
<i>argeli</i>	22-23	15	117-126	39-46	6 (3-4)	1
<i>subminuta</i>	24-26	19	{ 144-164 } 157-173	{ 72-89 } 72-96	8 (3-5)	2
<i>slolala</i>	21-24	19	118-158	50-89	8 (3-5)	1
<i>platyceps</i>	19-21	19	177-217 (232)	86-107	8 (3-5)	1 or 2
<i>beddoni</i>	28-34	19	140-150	62-85	8 or 9	1 or 2
<i>nigrocineta</i>	27-29	19	150-170	80-97	8 or 9	1 or 2
<i>monticola</i>	33-35	19	138-144	78-92	8 (3-5)	2
<i>chrysarga</i>	27-35	19	155-165	94-101	9 (3-5)	2
<i>callichroma</i>	27-35	19	152-159	79-86	8 (3-5)	1 or 2

the scales spotted or edged or thickly powdered with black, particularly on the posterior part of the body and tail; a complete yellow collar present in the young

Total length ♀ 900, tail 160, ♂ 865, tail 145 mm

Range Upper Burma (Bhamo district, Nam Tama and Adung Valleys), S E Tibet (Di chu Valley); Yunnan, Tong King (Col des Nuages), Western China

A hill species found generally at high elevations, 5,000-6 000 feet. Apparently common in some districts

202 *Natrix venningi*

Natrix venningi Wall, 1910 J Bombay N H S xx, p 345 (Chin Hills, Burma, London), and xxix, 1923 p 601, and xxii, 1926, p 580, Venning, *ibid* xx, 1911, p 773

Natrix nigrescens Wall 1925, J Bombay N H S xxx, p 588 pl (Huton, Bhamo, London)

Natrix venningi taronensis Smith, Rec Ind Mus xii, 1940, p 482 (Pangnandum London)

Maxillary teeth 27-32, gradually enlarged posteriorly, nostrils lateral or directed slightly upwards, internasals truncate and slightly narrowed anteriorly, as long as the prefrontals, usually 2 preoculars, temporals 1+1 or 1+2, 9 supralabials, 4th, 5th and 6th touching the eye. Body slender, scales in 17 rows, feebly keeled, the outer rows smooth

The hemipenis extends to the 8th caudal plate, not forked

Total length ♂ 605, tail 195; ♀ 680, tail 225 mm

Two races can be distinguished —

I *Natrix venningi venningi*

V 158-172, C 117-140

Very dark greyish brown above, with an indistinct chequering of small squarish black spots, a dorso-lateral chain of yellow spots in the young, sometimes persisting into adult life, lower parts yellowish, the shields heavily edged with dark brown, or entirely dark brown or black, head above with or without light vermiculations, an incomplete yellow collar present or absent

Range Upper Burma (Chin Hills, Bhamo district, Nam ta Valley)

A hill form. Wall records finding tadpoles in the stomach of one individual

II *Natrix venningi taronensis*

Differs from the typical form in having fewer caudal shields, 84-106, V. 166-176

Dark greyish brown above, with an indistinct chequering of small, squarish black spots, a dorso-lateral chain of small yellow spots, lower parts mottled with black and yellow anteriorly, entirely black posteriorly

Described from 10 specimens obtained by Mr. Ronald Kaulback at Pangnamdim (lat. $27^{\circ} 42' N.$; long. $97^{\circ} 54' E.$) and Aliwang, Taron Valley (lat. $27^{\circ} 42' N.$; long. $98^{\circ} 08' E.$), places north-east of Fort Hertz, Upper Burma.

Most of them were caught in small mountain streams.

203. *Natrix sauteri*.

Tropidonotus sauteri Boulenger, 1909, Ann. Mag. Nat. Hist. (8) iv, p. 495 (Formosa; London).—*Natrix sauteri*, Pope, Rept. China, 1935, p. 125, figs.; Bourret, Serp. Indochine, 1936, p. 58, fig. head.

Maxillary teeth 22–24, gradually enlarged posteriorly; internasals truncate anteriorly, nearly as long as the prefrontals; temporals 1+2; 7 supralabials, 4th and 5th touching the eye. Body rather stout; scales in 17 rows, feebly but distinctly keeled, the outer row smooth. V. 118–126; C. 61–73.

Greyish-brown above, with a dorso-lateral series of small, light (reddish in life), black-edged spots, which disappear on the posterior part of the body; lower parts whitish (? reddish in life), with a large black spot at the outer margin of each ventral shield, the spots forming a continuous line and separated from the colour of the back by a slightly lighter interval; head reddish-brown above, labials white, edged with black, the white colour continued backwards as a line on to the nape and converging towards its fellow.

Total length: 400, tail 105 mm. (♂).

Range. Tong-King (Tam-dao); S. China; Formosa.

Not uncommon at Tam-dao, according to Bourret. The above description is drawn up from his material in Paris.

204. *Natrix atemporalis*.

Natrix atemporalis Bourret, 1934, Bull. Gen. Instr. Pub. Hanoi, December, p. 75, fig. (Tong-King; Paris), and Serp. Indochine, 1936, p. 59, figs.

Maxillary teeth 28–30, gradually enlarged posteriorly; internasals truncate anteriorly, nearly as long as the prefrontals; temporal absent, or a minute one, between the 5th labial and the parietal; 6 supralabials, 3rd and 4th touching the eye. Scales in 17 rows, distinctly keeled, the outer row smooth. V. 129–146; C. 54–77.

Reddish-brown above, the scales finely edged with black, and with two light, dorso-lateral lines or series of spots present or absent; whitish below, with a black spot at the outer margin of each ventral, these sometimes confluent with the colour of the back.

Total length 390, tail 115 mm.

Range. Tong-King (Tam-dao).

205 *Natrix parallela*.

Tropidonotus dipaeus (non Blyth) Anderson, 1879 Anat & Zool. Rec Yunnan p 819 (Yunnan; London)

Tropidonotus parallelus Boulenger 1890, F B I. p 345, and Cat Sn Brit Mus i, 1893, p 223 (in part); Wall, J Bombay N H S xvii, 1903, p 316 fig head, and xix, 1909 p 340—

Natrix parallela Wall, J Bombay N H S xxix 1923 p 601 (in part); Smith, Rec. Ind Mus xlv, 1940, p 483; Shaw & others, J Darjeeling N H S xii, 1939, p 116

Natrix bitaeniata Wall 1925 J Bombay N H S xxx, p 806 (Kut kai, N Shan States; London), and xxxi, 1926 p 560; Pope Rept China, 1935, p 99

Natrix clerks Wall, 1925 J Bombay N H S xxx, p 809 (Kachin Hills, Burma; London) and xxxi, 1926, p 560

Tropidonotus chrysargus (non Boie), Boulenger, 1890, F B I p 345 and Cat Sn Brit Mus i 1893 p 258 (in part)

Maxillary teeth 20 to 24 gradually, sometimes rather abruptly, enlarged posteriorly, nostrils lateral, 1, sometimes 2, preoculars, internasals truncate anteriorly, temporals 1+1 or 1+2, 8 supralabials, 3rd, 4th and 5th touching the eye. Body slender, scales in 19 rows, the tips more or less distinctly bidentate, more or less strongly keeled. V 163-172, C 73-108

Hemipenrus to the 8th caudal plate, forked at the tip

Olive brown or greyish brown above, the scales sometimes black edged, and with 2 light, more or less distinct dorso-lateral black edged stripes or series of spots along the back and tail, a short yellow, vertebral streak behind the occiput a light chevron shaped mark on the nape pointing backwards present or absent, a black streak from the eye to the angle of the mouth, labials yellow, uniform, or the shields edged with black, ventrals and subcaudals uniform yellow or with a black dot on each side, top of head brown.

Total length ♂ 570, tail 140, ♀ 635, tail 135 mm.

Range Sikkim, Assam, Upper Burma, as far south as lat 22°, Yunnan, Tong King (Fan Si Pan Mts)

Wall (1925) has distinguished his *bitaeniata* (range Burma and Yunnan) from *parallela* (range E Himalayas and Assam) on the grounds that the former has teeth of the *Natrix* type, the latter of the *Rhabdophis* type. It is true that there are differences, but I do not find them as great as he makes out. The degree of enlargement of the posterior teeth does not vary greatly in the two forms, but while in *bitaeniata* there is no interval between the last two teeth and those that precede them, in *parallela* there is. The difference might be considered racial, but I prefer to regard the species as a border line case.

Pope (1935) dealing with this problem writes "Finding myself unable, through lack of sufficient material, to determine definitely the relation between *bitaeniata*, *parallela* and *octotaeniata*, I am treating them all as distinct species. I believe, however, that a thorough study will make it necessary

to change this arrangement. *N. octolineata* appears to be little more than subspecifically distinct from *biteniata*, which, in spite of Wall's contentions, seems to be of uncertain status in relation to *parallela*."

206. *Natrix nicobarensis*.

Tropidonotus nicobaricus and *nicobarensis* Selater, 1891, J. A. S. Bengal, lx, pp. 231, 241, 250, pl. 6 (Nicobars; Calcutta); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 192.—*Tropidonotus nicobariensis*, Annandale, J. A. S. Bengal, 1905, pp. 174, 175.—*Natrix nicobariensis*, Wall, J. Bombay N. H. S. xxix, 1923, p. 601.

Maxillary teeth about 25, gradually enlarged posteriorly; nostrils lateral; internasals truncate anteriorly; 1 pre- and 3 postoculars; temporals 1+2; 7 or 8 supralabials, 3rd and 4th, or 4th and 5th touching the eye. Scales in 19 rows, all strongly keeled. V. 160; C. 120; anal entire.

Greenish-olive above, with 3 light, black-edged stripes. The vertebral stripe extends the whole length of the body and tail and is strongly edged with black; the outer stripes, on scale-rows 2 and 3, do not extend beyond the body and are edged with small black dots; lower parts white; lips white; a dark temporal streak from behind the eye; parietals with a pair of small white spots.

Total length: 250, tail 177 mm.

Known only from the type-specimen, a juvenile. The jaws are damaged and it is not possible to count the number of teeth accurately, but the specimen otherwise is in a good state of preservation.

It was collected by Mr. de Roepstorff and was said to have come from Camorta in the Nicobars.

207. *Natrix khasiensis*.

Tropidonotus khasiensis Boulenger, 1890, F. B. I. p. 344 (Khasi Hills; London), and Cat. Sn. Brit. Mus. i, 1893, p. 223; Annandale, Rec. Ind. Mus. viii, 1912, pp. 49 and 53; Wall, J. Bombay N. H. S. xviii, 1908, p. 317.—*Natrix khasiensis*, Wall, J. Bombay N. H. S. xxix, 1923, p. 601, and xxxi, 1926, p. 559; Bourret, Serp. Indochine, 1936, p. 69, fig. head; Smith, Rec. Ind. Mus. xlii, 1940, p. 483.

Natrix gilhodesi Wall, 1925, J. Bombay N. H. S. xxx, p. 587, pl. (Huton, Bhamo; London).

Maxillary teeth 26 to 28, gradually enlarged posteriorly; nostrils lateral; internasals truncate anteriorly; 1 or 2 postoculars; temporals 1+1 or 1+2; 9, rarely 8, supralabials, 4th, 5th and 6th touching the eye. Body slender; scales in 19 rows, more or less strongly keeled, except the outer row, which is smooth or feebly keeled. V. 145-155; C. 94-110.

Hemipenis as in *parallela*.

Dark greyish or blackish-brown above, with or without indistinct light dorso-lateral stripes or series of spots; ventrals and subcaudals yellowish, the outer margins brown, like the dorsal scales, or with a brown spot; top of head with light vermiculations and usually 2 small spots, one on each side of the interparietal suture; labials white or yellow in the middle, black on the borders, the yellow colour of the lips may be continued backwards as a series of spots on each side of the neck.

Total length ♂ 570, tail 195; ♀ 600, tail 190 mm.

Range Arakan (Khasi and Garo Hills); Upper Burma (Abor country, Nawng Hkal in the Nam Tamal Valley; Bhamo district), Tong King (Chapa, Tam-dao). Common in the Khasi and Kachin Hills.

208 *Natrix modesta*.

Tropidonotus modestus Günther, 1875, P. Z. S., p. 252 (Khasi Hills; London); Anderson, Anat. Zool. Rev. Yunnan, 1879, p. 817; Boulenger, P. B. I. 1890, p. 343, and Cat. Sn. Brit. Mus. 4, 1893, p. 229. Angel, Bull. Mus. R. N. Paris (2), 4, 1929, p. 78. — *Natrix modesta*, Wall. J. Bombay N. H. S., xix, 1921, p. 435, and xxxi, 1928, p. 850.

Tropidonotus (Johnus) natrix Smith, 1921, P. Z. S., p. 424. *Natrix deschauvanei* Taylor, 1934, Pr. Acad. Sci. Pénins. Ind. p. 300 (Chiang Mai, N. Siam; not seen by me).

Maxillary teeth 28 to 32, gradually enlarged posteriorly, nostrils lateral, internasals as long as or nearly as long as the prefrontals, truncate anteriorly; usually 2 preoculars; temporals 1+1 or 1+2; normally 9 supralabials, 4th, 5th and 8th touching the eye. Scales in 19 rows, feebly or distinctly keeled, the outer 1 to 3 rows smooth, V and U, see table, A 2.

Hemipenis as in parallel.

Brown above with small black spots regularly arranged and a dorso-lateral series of small yellow spots which may be united to form an indistinct stripe; lower parts yellowish with black spots on the sides of the ventrals, sometimes forming continuous lines (Upper Burma, Cambodia, Annam), or with the median parts of the ventrals with small black dots (Kachin Hills), or with 3 series of squarish black spots almost entirely covering the ventrals (N. Siam), or with the ventrals almost entirely powdered with black (Khasi Hills and the Triangle); a yellow stripe on each side of the head starting from behind the eye and converging towards its fellow on the neck. Labials edged with black; top of head with indistinct vermiculations.

Total length ♂ 650, tail 185, ♀ 600, tail 140 mm.

Range. Assam (Khasi Hills); Upper Burma (Kachin and Bhamo districts); N. Siam; Cambodia (Kamchay Mts.); S. Annam (Langbian Plateau); Upper Laos (Chieng-Khoung) *vide* Angel. Found in the hills at between 2,000 and 5,000 feet altitude.

Natrix modesta, as I conceive it, is a widely distributed and very variable species. The variations in ventral colouring have already been given. The ventral and caudal counts are shown in the following table:—

Locality.	Ventrals.	Caudals.	No. examined
N. Siam, Burma, Assam	148-168	110-132	18
Kamchay Mts., Cambodia	154-167	98-110	7
Langbian Plateau	149-154	83-104	6
Isthmus of Kra (<i>N. groundwateri</i>) ..	147-154	120-132	6
Pen. Siam and Malay Peninsula } (<i>N. inas</i>)	143-148	96-109	4

The caudal counts, owing to the number of docked tails, are far from complete. For comparison the counts of *N. inas* and *N. groundwateri* are included, as they are undoubtedly very closely allied to, if not racial forms of, *modesta*. In one example of *N. groundwateri* the anal plate is divided, in the remainder it is entire.

209. *Natrix pealii*.

Tropidonotus pealii Sclater, 1891, J. A. S. Bengal, 12, p. 241, pl. vi, fig. 4 (Sibsagar, Assam; Calcutta); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 214.—*Natrix pealii*, Wall, J. Bombay N. H. S. xxix, 1923, p. 600.

Maxillary teeth 19 to 21, gradually enlarged posteriorly; nostrils lateral; internasals truncate anteriorly, distinctly shorter than the prefrontals; 1 pre- and 2 or 3 postoculars; temporals 2+2; 9 supralabials, 4th and 5th touching the eye, the 6th excluded by the lowest postocular. Scales in 19 rows, strongly keeled, except the outer row, which may be smooth; all the caudal scales strongly keeled. V. 142-144; C. 75-77, the anterior 4 to 7 single; A. 1.

Hemipenis extending to the 9th caudal plate, not forked.

Dark brown above, with a narrow light dorso-lateral stripe and a broader pale one occupying scale-rows 1 and 2; below dark brown, each ventral and caudal shield with a yellow spot at the outer margin, and an indistinct yellow median series of spots; head dark brown above, the rostral and labials yellow, edged with brown.

Total length 525, tail 130 mm.

Known only from two specimens, both males.

210 *Natrix xenura*.

Tropidonotus xenura Wall. 1907, *J. Bombay N. H. S.* xvii p. 616 (type-locality not known; type lost), and *Rec. Ind. Mus.* iii. 1909, p. 143—*Natrix xenurus*, Wall, *J. Bombay N. H. S.* xxix, 1923 p. 601

Maxillary teeth 22 or 23, gradually enlarged posteriorly, nostrils lateral, internasals as long as or shorter than the prefrontals, 1 pre and 3 postoculars; 9 (10) supralabials, 3rd and 4th touching the eye, temporals 2+2. Scales in 19 rows, all strongly keeled. V 153-165, C 82 (♀) to 105 (♂), all entire, A entire or divided.

Hemipenis extending to the 8th caudal plate, not forked.

Dark olive-brown above with indistinct narrow blackish cross bars or series of spots, interrupted on the dorso-lateral line by white (or yellow) spots, whitish or yellowish below with dark brown squarish spots at the outer margins of the ventrals, tail more thickly spotted, labials white, the sutures black-edged, a white streak from behind the angle of the mouth on to the neck.

Total length ♂ 630, tail 190, ♀ 590, tail 160 mm; another female is 680 mm in total length, but has lost a considerable part of the tail.

The type is lost, three more specimens were discovered in 1911 by Wall in the Indian Museum, labelled *modesta*, to which species it bears considerable resemblance in general coloration. They are from Cherrapungi in the Khasi Hills, Assam.

211 *Natrix punctulata*.

Tropidonotus punctulatus Günther, 1858, *Cat. Col. Sn. Brit. Mus.* p. 247 (type locality unknown, London), Boulenger, *F. B. I.* 1899 p. 360, and *Cat. Sn. Brit. Mus.* v, 1893, p. 228, pl. xiv, fig. 2. "Hewson," *J. Bombay N. H. S.* i, 1895, p. 173—*Aerodia punctulata*, Wall, *J. Bombay N. H. S.* xxix, 1923, p. 603. *Foulea pygmaea* Theobald, 1866, *Cat. Rept. Asiat. Soc. Mus.* p. 67 (Rangoon, Calcutta).

Maxillary teeth 26 to 30, gradually enlarged posteriorly, nostrils directed slightly upwards, internasals much narrowed anteriorly, as long as the prefrontals, frontal constricted in the middle, twice as long as broad, 1 preocular, temporals 2+3, 9 supralabials, 4th and 5th touching the eye, 6th excluded by the lowest postocular. Body moderately slender; scales in 17 rows, all smooth. V 134-154, C 70-83.

Hemipenis as in *piscator* but with only two longitudinal folds.

Brown or black above, with small pale markings or dots, two outer rows of scales, ventrals and subcaudals yellowish, with dark margins, upper lip uniform yellowish, frequently a light, curved, longitudinal streak on each side of the nape.

Total length ♂ 640, tail 145, ♀ 630, tail 160 mm.

Range. Tenasserim; Lower Burma (Pegu, Watiya, Rangoon, Amherst).

Largely aquatic in its habits; Keswal records that it enters salt water.

212. *Natrix piscator*.

CHECKERED KEELBACK.

- Russell, 1796, Ind. Serp. i, p. 25, pl. 20 ("Paragoodoo"); p. 33, pl. 28 ("Naugecalled Keaka"; Ganjam); p. 38, pl. 33 ("Neeli Koea"); ii, 1801, p. 5, pl. 3 ("Doobleo"); p. 6, pl. 5 ("Dora"); p. 16, pl. 14 ("Ourdia"; Bombay); p. 17, pl. 1, fig. 5 A ("Noor Pamboo"; Tranquebar and Ourdia; Bombay).
- Hydrus piscator* Schneider, 1799, Hist. Amph. i, p. 247 (East Indies; based on Russell's "Neeli Koea").—*Tropidonotus piscator*, Boulenger, F. B. I. 1890, p. 349 (in part), and Cat. Sn. Brit. Mus. i, 1893, p. 230; Wall, J. Bombay N. H. S. xvii, 1907, p. 857, col. pl., and xviii, 1908, p. 317, and xix, 1909, p. 611, and xxvi, 1919, p. 560; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 14; De Rooij, Rept. Indo-Austral. Archipel. ii, 1917, p. 76, fig.—*Nerodia piscator*, Wall, J. Bombay N. H. S. xxix, 1923, p. 603, and Sn. Ceylon, 1921, p. 91; Prater, J. Bombay N. H. S. xxxii, 1927, p. 225, and xxx, 1924, p. 167; Fraser, ibid. xxxix, 1937, p. 467, pl. vii.—*Natrix piscator*, Popo, Rept. China, 1935, p. 120, fig.; Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 117; Bourret, Serp. Indo-Chine, 1936, p. 75.
- Hydrus palustris* Schneider, 1799, Hist. Amphib. i, p. 247 (based on Russell's "Paragoodoo").
- Coluber anostomosatus* Daudin, 1803, Hist. Nat. Rept. vii, p. 140 (based on Russell's "Neeli Koea").
- Coluber braminus* Daudin, l. c. s. p. 176 (subst. name for *palustris*).
- Coluber umbratus* Daudin, l. c. s. p. 144 (based on Russell's "Dobleo").
- Coluber mortuarius* Daudin, l. c. s. p. 187 (based on Russell's "Naugecalled Keaka").
- Coluber dora* Daudin, l. c. s. p. 191 (based on Russell's "Dora").
- Tropidonotus melanostus* Boie, 1826, Isis, p. 206 (Java); Boulenger, Cat. Sn. Brit. Mus. i, 1893, p. 230.
- Coluber bengalensis* Gray, 1834, Ill. Ind. Zool. ii, p. 82, figs. 1-3 (Bengal).
- Coluber rectangularis* Gray, l. c. s. figs. 4-6.
- Tropidonotus quincunciatus* Schlegel, 1837, Phys. Serp. ii, p. 307, pl. 12, figs. 4, 5 (India).
- Amphisma flavipunctatum* Hallowell, 1860, Pr. Acad. Sci. Philad. p. 503 (Kwangtung Prov., China).
- Tropidonotus tyleri* Blyth, 1863, J. A. S. Bengal, xxxii, p. 88 (Andaman Is.: type lost).
- Tropidonotus striolatus* Blyth, 1868, in Theobald's Cat. Rept. Mus. Asiat. Soc. p. 55 (Andaman Is.: type lost), and Rept. Brit. Ind. 1876, p. 175.
- Tropidonotus quincunciatus* var. *Günther*, 1858, Cat. Sn. Brit. Mus. p. 66 (Kashmir; London).
- Tropidonotus sancti-johannis* Boulenger, 1890, F. B. I. p. 350, and Cat. Sn. Brit. Mus. i, 1893, p. 230, pl. xv, fig. 1 (based on Günther's var.).
- Tropidonotus asperimus* Boulenger, 1891, Ann. Mag. Nat. Hist.

(6), vii, p 281, and Cat Sn Brit. Mus i, 1893, p 232, pl. xv, fig 2 (Ceylon; London)

Natrix piscator piscator, Smith, Rec. Ind Mus xli, 1940, p 483.

Tropidonotus piscator, var. *unicolor*, *lateralis*, *punctatus*, *obscurus*, *ornata* Wall, 1907, J Bombay N H S xvii, pp 860-863

Names proposed by the author to differentiate his colour forms

Maxillary teeth 22 to 28, gradually enlarged posteriorly; nostrils directed slightly upwards; frontal constricted in the middle, twice as long as broad, internasals much narrowed anteriorly, as long, or nearly as long, as the prefrontals; 1 preocular, temporals 2+2 or 2+3; 9 supralabials, 4th and 5th touching the eye, the 6th excluded by the lowest post-

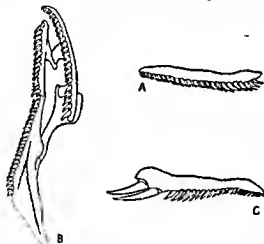


Fig 95—A. Maxilla and B. palate maxillary arch of *Natrix piscator*
C Maxilla of *Natrix submansala*.

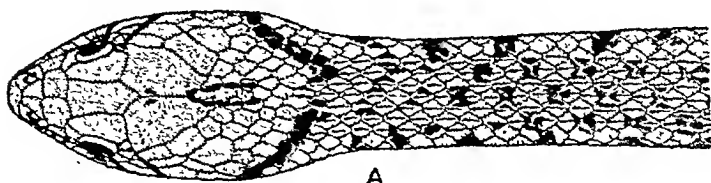
ocular Body rather stout, scales in 19 rows, more or less distinctly keeled, except the outer one or two rows which are smooth. V 122-158; C (60) 70-87.

Hemipenis extending to the 12th caudal plate, forked for about one-third of its length, it is spinose throughout, the spines being relatively coarser at the distal end than at the proximal, extending for the greater part of its length are four prominent folds, there are no basal spines

Total length ♂ 990, tail 310; ♀ 1200, tail 300 mm
Four fairly well defined races can be distinguished, each with its own geographical range The typical form of each is described, but departures from it are not uncommon

I. *Natrix piscator piscator*.

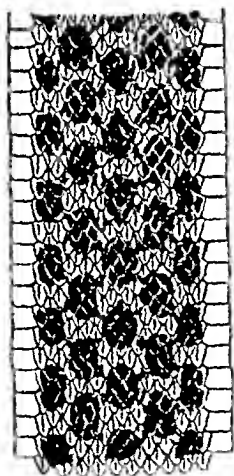
1. Scales more or less strongly keeled. Yellowish or olivaceous above, with black spots quincuncially arranged;



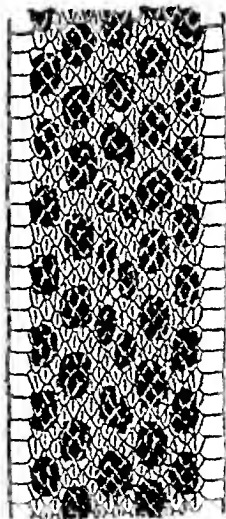
A



B



C



D

Fig. 96.—*Natrix piscator*. A. Dorsal, B. Lateral, view of head (B.M. 39.7.1.5); C. and D. Dorsal pattern of *N. p. piscator*.

belly uniform whitish or yellowish; head olive-brown above, with two oblique black streaks, one below, the other behind, the eye. The dorsal spots are arranged in five series, namely,

a vertebral, 2 dorso-lateral and 2 lateral. Together they form a chess board pattern. They may be small or large, sometimes so large that they occupy most of the back, the snake then appearing black, with small yellowish spots, the dorso-lateral series being the most conspicuous. The black spots are arranged in transverse series of 5 (fig 96 C) or 6 (fig 96 D), the 6th being formed by division of the vertebral one. The number is not constant throughout the body and usually varies at different levels. The outer row is usually larger than the others, the spots there forming short transverse bars.

Range The whole of India to Baluchistan and the N.W.F. Provinces extending into the Indo-Chinese region as far east as Myitkina in Upper Burma. See also under *melanocephalus*.

2 Scales feebly keeled, sometimes almost smooth. Pale olive above, uniform or with black spots quincuncially arranged, or with two series of whitish spots along the body, belly uniform yellowish (*sandwichianus*). A pale form derived from the previous one by a general reduction of the colour pattern.

Range The Himalayas, North West and Central Provinces, Upper Burma, Yunnan, Upper Laos.

II. *Natrix piscator flavipunctata*

Scales more or less strongly keeled. Olivaceous above, with black spots quincuncially arranged, belly whitish or yellowish, the ventrals edged with black. Head as in I. The spots in this form are never large, as they may be in Form 1, and they may be broken up and confined to the edges of the scales, forming a reticulate pattern. In transverse series there are 6 or 7 the 7th being formed by division of the vertebral spot into 3 small yellow spots, either as a dorso-lateral series or a reticulate pattern, present or absent, this colour being largely on the interstitial skin.

Range The Indo-Chinese region as far west as Assam, Hainan, Hong Kong, Southern China.

In this form, and in I, a considerable amount of red or scarlet coloration in life is often present. It is confined chiefly to the interstitial skin of the fore body and shows up best when the snake, under excitement, dilates itself.

III. *Natrix piscator asperimus*

Scales very strongly keeled. V 131-146, C 73-93. Anterior half of body pale olive or reddish, with two series of more or less distinct, large, roundish or rhomboidal, alternating, dark brown, black edged spots, which are partly confluent on the vertebral line and may form a sinuous stripe. Under part of body dark olive, usually with blackish spots quincuncially arranged, sometimes a series of yellow dorso-lateral spots, belly whitish or yellowish, head as in I.

Range Ceylon.

IV. *Natrix piscator melanzostus*.

Pale, olivaceous, with 5 (4 on the neck) dark brown or blackish longitudinal stripes, extending the whole length of the body; the vertebral and dorso-lateral ones are more or less united and form a broad stripe, the intervening light area being inconspicuous; belly whitish or yellowish; head brown above; a black subocular and a postocular stripe, the latter bordering the brown on the temple. This colour form closely resembles the one that is found in the Malay Archipelago (Java, ? Borneo) and in which the five stripes may be quite distinct. It is the *tylleri* of Blyth, and the *striolatus* of Theobald, and is figured by De Rooij under the name of *N. piscator*.

A second colour form, found also in the Andamans, resembles the large-spotted Indian form (fig. 96 C); the vertebral series of spots may be united to form a sinuous stripe on the fore-part of the body. This variety may be quite distinct, or combined with the other, being then like *melanzostus* on the anterior part of the body and *piscator* on the hinder part.

The production of the stripes is effected by the fusion of the dorsal spots in longitudinal series.

The evolution of certain forms of colour pattern is well shown in *Natrix piscator*. The production of an extra spot, as in 6 from 5, is not just a doubling of the vertebral spot. It is brought about by a shifting of the pattern of the entire half of the body at that point. It may be either forwards or backwards; it may be a gradual change or an abrupt one. In snakes which have annulate markings this shifting is clearly seen, some of the annuli being broken exactly in the mid-dorsal and mid-ventral lines, so that the snakes appear as if formed of the right and left halves of two individuals.

Russell has given 7 figures of this snake, all showing the chequered type of pattern. In vol. i, pls. 20 and 28 and vol. ii, pl. 15 the spots are small: in vol. i, pl. 33, they are of medium size; in vol. ii, pls. 3, 5 and 14 they are large or very large.

Wall (1907 and 1921) has given excellent accounts of the habits of this common snake. It is essentially a snake of the plains, and of the hills at low altitudes. In Siam it is one of the commonest snakes in the rice fields and is seldom found far from water, to which it takes readily. It is diurnal in its habits and is extremely active in its movements; it bites fiercely when first caught but is quickly tamed. When cornered in the fields I have seen it spring at the aggressor, the whole snake leaving the ground in its fury. It feeds upon frogs and fish, making enormous meals of the latter when they get herded into small pools at the end of the dry season. Breeding appears to take place over the greater part of the year. Wall states (1921), "with the exception of the Python

and Russell's Viper it is the most prolific snake I know." The number of eggs is said to range from 8 to 87. In southern India it estivates towards the end of the hot weather, in the northern parts it hibernates during the cold weather.

213 *Natrix trianguligera*

Tropidonotus trianguligerus Bosc, 1827, *Isa.* p. 535 (Java).
Boulenger, *Cat. Sn. Brit. Mus.* l. 1893, p. 224, and *Fauna Malay Pen.* 1912, p. 125. Anderson, *J. Linn. Soc.* xii, 1893 p. 335. Schlater, *J. A. S. Bengal* ix, 1891, p. 242.—*Natrix trianguligerus* Wall, 1923, *J. Bombay N. H. S.* xxix, p. 601.

Maxillary teeth 32 to 34, gradually enlarged posteriorly, nostril directed slightly upwards; internasals distinctly narrowed anteriorly, sometimes truncate, longer than the prefrontals, 1 preocular, temporals 2+2, sometimes 1+2, 9 supralabials, 4th, 5th and 6th touching the eye. Body rather stout, scales in 19 rows, strongly keeled, except the outer 1 or 2 rows, which are smooth. V. 134-145; C 86-95.

Hemipenis to the 6th caudal plate, forked at the extreme tip.

Dark olive above with small black spots and a lateral series of large triangular ones, the points of which extend on to, and sometimes across, the ventrals; in the young they are strongly marked, but gradually become indistinct with age, and in old individuals may be hardly distinguishable, a dorso-lateral series of light spots often present; lower parts yellow, lips yellow, the shields sometimes edged with black.

Total length ♂ 870, tail 225, ♀ 850, tail 225 mm.

A Malayan species that extends its range into the Indo-Chinese region, as far north as Mergul.

The two following species are very closely allied to it and appear to be its northern representatives, *N. bellula* on the Burmese side, *N. percarinata* on the Chinese.

214 *Natrix bellula*

Tropidonotus bellulus Stoliczka, 1871, *J. A. S. Bengal* xi, pt. 2, p. 532, pl. xxvi, fig. 2 (Prome, near Pegu, type lost).
Thobald, *Cat. Rept. Brit. Ind.* 1876, p. 176. Boulenger, *F. B. I.* 1890, p. 350.

Tropidonotus trianguligerus, Boulenger, *Cat. Sn. Brit. Mus.* 1893 l. p. 224 (in part).—*Natrix trianguligerus*, Wall, *J. Bombay N. H. S.* xiii, p. 569.

Maxillary teeth 32 to 34, gradually enlarged posteriorly; nostrils directed slightly upwards, internasals truncate anteriorly, as long as the prefrontals, 1 preocular, temporals 1+2, 9 supralabials, 3rd, 4th and 5th touching the eye. Body rather stout, scales in 19 rows, more or less strongly keeled, except the outer row, which may be smooth. V. 139-144, C 78-83 (Stoliczka).

Hemipenis to the 8th caudal plate, not forked.

Dark olive-green above with indistinct black spots quincuncially arranged, and a dorso-lateral series of light spots or short cross-bars; lips white, the sutures edged with black, the white extending as a vertical bar in front of and behind the eye; sides of the neck and fore part of body with white vertical bars; ventrals white, the shields heavily edged with black.

Total length: 500, tail 145 mm. (♂).

The type is lost, but a half-grown individual, agreeing in all essential particulars with Stoliczka's description, was obtained recently near Rangoon by Prof. F. J. Meggitt. Wall (1926) records a snake, from Minhla, Thayetmyo district, which is presumably this species.

215. *Natrix percarinata*.

Tropidonotus percarinatus Boulenger, 1899, P. Z. S. p. 163, pl. 17, fig. 2 (N.W. Fukien; London).—*Natrix percarinata*, Smith, J. Nat. Hist. Soc. Siam, vi, 1923, p. 201, and Rec. Ind. Mus. xlii, 1940, p. 483; Parker, Ann. Mag. Nat. Hist. (9) xv, 1925, pp. 302 and 304; Pope, Rept. China, 1935, p. 116, pl. vi.—*Natrix annularis percarinata*, Bourret, 1936, Serp. Indochine, p. 80.

Maxillary teeth 30 to 34, gradually enlarged posteriorly; nostrils directed slightly upwards; internasals distinctly narrowed anteriorly, usually longer than the prefrontals; 1 preocular; temporals 2+3, rarely 3+3; 9 supralabials, 4th and 5th touching the eye, 6th excluded by the lowest postocular.

Body rather stout; scales in 19 rows, strongly keeled, the outer row sometimes smooth. V. 133-157; C. 68-85, for specimens from the Indo-Chinese region.

Hemipenis extending to the 8th caudal plate, forked near the tip.

Young: dark olive-green or grey above, the colour descending on the sides of the body as V-shaped bars, often continued round to form complete bands; lower parts and intervals between the bars on the sides of the body yellow. Adult: olivaceous or greyish above, uniform or with dark reticulations or with dark cross-bars enclosing lightish spots; laterally they just reach the ventrals and are edged in front and behind with white; they may or may not bifurcate; whitish below, with or without indistinct dark cross-bars.

Total length: ♂ 720, tail 190; ♀ 940, tail 270 mm.

Range. Upper Burma (Gole Tutap) and Suprabum in the Triangle; N. Siam (Doi Su-tep); Tong-King; Annam (Kon-tum); Hainan; Southern China; Formosa.

N. percarinata, according to Pope, inhabits the water-courses in forested, hilly country. It feeds upon frogs and their larvae, fish and crustacea. From 4 to 12 eggs are laid at a time.

216 *Natrix angel*

Natrix (*Rhabdophis*) *angel* : Bourret 1934 Bull. Gen. Instr. Pub. Hano April p 151 (Tam-dao Tong King Paris) — *Rhabdophis angel* Bourret Serp. Indochine 1936 p 102, fig head

A nuchal groove and gland the scales on each side of the groove distinctly enlarged and paired. Maxillary teeth 22 to 23 the last two abruptly and very strongly enlarged nostrils lateral internasals as long as the prefrontals 1 pre- and 3 postoculars temporals 1+2 6 supralabials 3rd and 4th touching the eye 5th very large scales in 15 rows throughout feebly keeled the outer rows smooth V 117 126 C 39-46

Brownish above with a dorsal lateral series of small reddish spots best marked anteriorly a pale (orange in life) A shaped mark on the neck its apex forwards top of head brown lips lighter a black spot below the eye another at the angle of the mouth lower parts anteriorly pale orange speckled with brown this colour rapidly increasing in amount so that the hinder parts are entirely brown

Total length 430 tail 70 mm

Known only from the type locality

This very distinct species combines the dental characters of *subminiata* with the nuchal scale characters of *n. chalis*

217 *Natrix himalayana*

HIMALAYAN KEELBACK

- Tropidonotus himalayanus* Gunther 1864 Rept. Brit. Ind. p 765 pl. xx, fig. 11 (Sikkim and Nepal London). Boulenger F.B.I. 1896 p 347 and Cat. Sn. Brit. Mus. 1, 1893 p 251. Wal. J. Bombay N.H.S. xvii, 1908 p 319 and xix, 1909 pp 341 and 614. Vonnung ibid. xx, 1910 p 341 — *Macropsis hodon himalayanus* Annandale, J.A.S. Bengal. 1, 1905 p 210. *Rhabdophis himalayanus* Wall. J. Bombay N.H.S. xxv, 1903 p 603 — *Natrix himalayana* Smith P.Z.S. 1938 p 579 and Rev. Ind. Mus. xlii, 1940 p 483. Shaw & Scherzer J. Darjeeling N.H.S. xiii, 1929 p 120. *Tropidonotus himalayanus* col. var. *ornatus* Wall. 1909, J. Bombay N.H.S. xvi, p 319 (Khas Hills). *Natrix spinosus* Wal. 1903 J. Bombay N.H.S. xxx, p 33 (Hutan Kachin Hills London) and xxxi 1906 p 561.

A nuchal groove more or less distinct the three median rows of scales of that region narrower than the others the vertebral row sometimes hidden between the two adjacent rows. Maxillary teeth 28 to 29 the last two strongly and abruptly enlarged nostrils lateral 1 preocular temporals 2+2 or 2+3 8 supralabials 4th and 5th touching the eye. Body rather stout scales in 19 rows strongly keeled those of the outer row feebly keeled V 151 178 C 79-95

Hemipenrus extending to the 7th caudal plate not forked is spinose throughout the spines being of rather large size

and longer at the distal end than at the proximal end; at the base of the organ on either side of the sulcus are two enormous spines.

Olive above with small black spots, and two dorso-lateral series of small yellow spots or narrow cross-bars, rarely absent; lower parts yellowish, speckled with brown or black or nearly entirely greyish or blackish; a yellow or orange collar usually interrupted in the middle and succeeded by a dark cross-bar or triangular patch; labials yellow with black sutures; sometimes two oblique black bars, one below, the other behind the eye; neck and fore-body sometimes with a reticulation of black and yellow, the colours confined very largely to the interstitial skin.

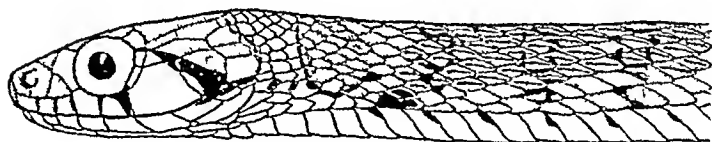
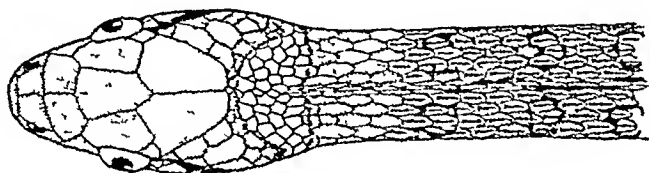


Fig. 97.—*Natrix himalayana*. (B.M. 67.7.22 1.)

Wall, writing of his colour variety *ornatus*, states:—"All the specimens were remarkable for the brilliancy of their adornment. Besides the conspicuous yellow or orange collar with its broader posterior black border, these specimens were ornamented behind the yellow with an intensely brilliant chequering of vermillion, more or less apparent in the anterior half of the body, but reducing in brilliancy from before backwards."

Total length: ♂ 820, tail 215; ♀ 1250, tail 305 mm.

Range. The Eastern Himalayas as far west as Sikkim; Assam; Upper Burma, north to lat. $27^{\circ} 42'$ and as far south as lat. 22° N.

Kaulback obtained two specimens in the Triangle on July 24th *in copula*.

218 *Natrix subminiata*.

RFO NICKED KEELBACK

- Tropidonotus subminiatus* Schlegel, 1837, *Phys. Serp.* ii, p. 313 (Java, Ie Jan) Boulenger, F B I 1890, p. 347, and Cat. Sn. Brit. Mus. 1893 p. 256, Wall. J. Bombay N H S xiii 1903 p. 229 and xix, 1909, pp. 341 and 818; Vennig, ibid. xx, 1910-1911, pp. 341 and 773, Smith, J. Nat. Hist. Soc. Siam, i, 1914 p. 15—*Rhabdophis subminiatus*, Wall. J. Bombay N H S xix 1923, p. 606, and xxx, 1925, p. 810, and xxxi, 1926 p. 661, Bourret, *Serp. Indochine*, 1936, p. 95—*Natrix subminiata*, Smith P Z S 1936, p. 579, Shaw & others, J. Darjeeling N H S xii, 1932, p. 122.
- Natrix helleri* Schmidt 1925, *Amer. Mus. Nov.*, no. 157 (Nodoe, Hainan, N. York)—*Natrix subminiata helleri*, Pope, Rept. China, 1935, p. 132, fig. 8, Smith, *Rec. Ind. Mus.* xxvii, 1935, p. 239, and xiii 1940 p. 483.
- Natrix subminiata hongkongensis* and *N. s. sinensis* Mell, 1931, *Lingnan Sci. Journ.* viii, p. 203 (Hongkong and Siam), Greenitt, *Peking Nat. Hist. Bull.* xv, 1941, p. 187.
- Natrix (Rhabdophis) kaobaornensis* Bourret, 1934, *Bull. Gen. Instr. Pub. Hanoi*, May, p. 169 (Lao hao, Annam; Paris)—*Rhabdophis himalayensis kaobaornensis*, Bourret, *Serp. Indochine*, 1936, p. 90, fig. head.

A nuchal groove and gland, the scales on each side of the groove being distinctly enlarged and paired in the northern form (*helleri*), less distinctly, sometimes not at all, in the southern (*typica*). Maxillary teeth 24 to 26, the last two abruptly and very strongly enlarged (fig. 95 C, p. 294), nostrils lateral, internasals as long, or nearly as long, as the prefrontals; 1 preocular, temporals 2+2 or 2+3; normally 8 supralabials, 3rd, 4th and 5th touching the eye. Body rather stout; scales in 19 rows, strongly keeled, the outer row smooth.

Hemipenis extending to the 15th caudal plate, forked for nearly $\frac{1}{2}$ of its length, there are no basal spines.

Olive brown or greenish above, almost uniform or with black and yellow reticulations, the colour being confined to the interstitial skin and the edges of the scales, an oblique black bar below the eye, belly yellowish, sometimes with a black dot on the outer end of each ventral shield, neck in life tinged with vermilion, the colour confined chiefly to the interstitial skin, young with a jet-black cross-bar or triangular mark on the nape, bordered with yellow behind.

Range. The whole of the Indo-Chinese subregion as far as Sikkim in the north-west; southern China, Hainan, Hong-Kong, the Malay Peninsula and Archipelago.

Two forms can be defined, a smaller southern form (*s. subminiata*) and a larger northern one (*s. helleri*). Morphologically they appear to intergrade completely with one another, but the extremes differ so much that they might well be regarded as distinct species. The boundary line between the two is not clear; I tentatively place it at lat. 22° N.

N. s. helleri does not range south of this line, but *N. s. subminiata* often occurs north of it.

I. *Natrix subminiata subminiata*.

V. 144-164; C. 72-89. Total length: ♂ 750, tail 185; ♀ 750, tail 180 mm. Colour as described, the subocular bar usually very distinct. The nuchal groove and enlarged nuchal scales are not conspicuous, and in specimens from the extreme south of Indo-China are usually entirely absent.

Specimens from Malaya not included.

II. *Natrix subminiata helleri*.

V. 157-173; C. 72-96. Total length: ♂ 950, tail 235; ♀ 1300, tail 300 mm. Adults may be almost uniform in coloration; the belly is powdered with grey, and the subocular bar is indistinct or absent. The nuchal groove and enlarged paired scales are always distinct; juveniles are coloured like the typical form.

N. subminiata is found both in the plains and in the hills. Wall states that it is uncommon in the plains in Burma, but is common in many of the hilly districts. Exactly the reverse obtains in Siam, where it is one of the commonest of snakes in the great central plain north of Bangkok, but almost unknown in the hilly districts.

In Siam it is diurnal in its habits, and is very active; although it will bite freely when first caught, it quickly becomes tame. It feeds chiefly on frogs and toads. When excited it will erect the body and flatten the neck in a marked manner.

219. *Natrix stolata*.

STRIPED KEELBACK.

Coluber stolatus Linn. 1758, Syst. Nat. 10th Ed. p. 219 and 12th Ed. 1766, p. 379 (Asia; Stockholm); Russell, Ind. Serp. i, 1796, pp. 14, 15, pls. x, xi (Ganjam); Andersson, Bih. Sven. Vet. Akad. Handl. Stockholm, xxiv, (4) 6, 1899, p. 12.—*Tropidonotus stolatus*, Boulenger, F.B.I. 1890, p. 348, and Cat. Sn. Brit. Mus. i, 1893, p. 253; Wall, J. Bombay N. H. S. xvi, 1905, p. 302, and xviii, 1907, pp. 108 and 205, and 1908, p. 320, and xix, 1909, p. 615, and xx, 1911, p. 603, col. pl., and xxvi, 1919, p. 562.—*Rhabdophis stolatus*, Wall, Sn. Ceylon, 1921, p. 105, and J. Bombay N. H. S. xxix, 1923, p. 805; Prater, ibid. xxx, 1924, p. 168; Fraser, ibid. xxxix, 1937, p. 469; Bourret, Serp. Indochine, 1936, p. 82.—*Natrix stolata*, Pope, Rept. China, 1935, p. 128; Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930, ii, p. 24; Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 121.

Elaps bilineatus Schneider, 1801, Hist. Amphib. ii, p. 299 (India). *Tropidonotus stolatus* var. *erythrostictus* Wall, 1911, J. Bombay N. H. S. xx, p. 606.

? *Tropidonotus ruficeps* Peters, 1869, Mon. Akad. Berlin, p. 444 ("California").

Maxillary teeth 21 to 24, the last two strongly and abruptly enlarged; nostrils directed slightly upwards; internasals much narrowed anteriorly, as long, or nearly as long, as the

prefrontals frontal constricted in the middle, twice as long as broad 1 preocular temporals 1+1 or 1+2, normally 8 supralabials 3rd 4th and 5th touching the eye Scales in 19 rows strongly keeled except the outer row which is smooth the tips more or less distinctly bidentate V 118-153, C 50-89

Hemipenis extending to the 8th caudal plate, forked at the extreme tip it is spinose throughout, the spines being closely set and of almost equal size there are no basal spines

Olive greenish or brownish above with black spots or reticulated cross bars intersected by two dorso-lateral yellow or buff stripes on the under part of the body the stripes are best marked and the black spots least evident, the green colour being almost uniform dark olive lower parts whitish sometimes with a small black spot on the side of each ventral shield top of head olive uniform or the shields edged with black lips yellowish the colour extending up as a vertical bar in front of and behind the eye, the shields may or may not be edged with black In the newly born the light dorso-lateral stripes are replaced in the fore part of the body by a series of spots

Wall (1911) describes two colour forms as follows —

Forma typica The margins of the scales, especially towards their bases are adorned with blue-grey or pale blue The colouring is concealed when the snake is quiescent and only comes into view when the snake under excitement inflates itself It is most conspicuous, and may be confined to the anterior part of the body This is the common type and may be met with anywhere

Var erythrostictus In this the far more beautiful variety, bright vermillion replaces the blue adornment of *forma typica* it is also more extensively distributed and is more or less evident in the quiescent state Specimens so ornamented have a speckling of the same hue on the belly, and in some the throat is yellow or orange

This variety is very local and appears to be confined to the coastal areas

Total length ♂ 720, tail 180 ♀ 620, tail 170 mm

Range Ceylon the whole of India to Sind and the N W F P (Wall), southern China Hainan, Indo-China as far south as lat 14° N, the Andaman Is

I am unable to find any authentic proof that this snake occurs in Southern Indo-China or in any part of the Malayan subregion. In Burma it is recorded from Tenasserim, but without precise locality I have seen specimens from Central Siam (Lopburi Chamat Paknampong Gengko Krabin) Bourret states that it is common in Tongking but that he has not obtained it in the southern parts of French Indo-China.

the records from the Malay Peninsula are old and have never been confirmed.

Wall (1911 and 1921) has given excellent accounts of this little snake, and the following remarks are taken mainly from his articles.

It is common in many parts of Ceylon, India and northern Indo-China, inhabiting both the plains and the hills to altitudes of 5,000 and 6,000 feet. It is diurnal in its habits and of gentle disposition, never attempting to bite when handled. It feeds mainly on frogs and toads. In India it aestivates towards the end of the dry season, re-appearing as soon as the monsoon breaks. In northern India it hibernates during the cold weather. Mating appears to take place during aestivation, and the eggs, usually from 5 to 10 in number, are laid during the months from May to September. The hatchlings measure from 130 to 170 mm. in length.

220. *Natrix platyceps*.

Tropidonotus platyceps Blyth, 1854, J. A. S. Bengal, xxiii, p. 297 (Assam and Darjeeling; Calcutta); Boulenger, F. B. I. 1890, p. 343, and Cat. Sn. Brit. Mus. i, 1893, p. 248; Wall, J. Bombay N. H. S. xix, 1909, p. 340; Annandale, Rec. Ind. Mus. 1912, p. 49.—*Rhabdophis platyceps*, Wall, J. Bombay N. H. S. xxix, 1923, p. 604.—*Natrix platyceps*, Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 118.

Herpetorcas sieboldii Günther, 1860, P. Z. S. p. 156 (Himalayas: London).

Zamenis himalayanus Steindachner, 1867, Sitz. Ber. Zool. bot. Ges. Wien, xvii, p. 513, pl. xiii, fig. 1 (Himalayas: Vienna; not seen by me).

Tropidonotus chrysargus, (non Boie) Wall, 1907, Rec. Ind. Mus. i, p. 156.

Tropidonotus firhi Wall, 1914, J. Bombay N. H. S. xxiii, p. 186 (Chittong, Nepal; Calcutta).—*Rhabdophis firhi*, Wall, ibid. xxix, 1923, p. 606.

Maxillary teeth 19 to 21, last two fairly strongly and abruptly enlarged; nostrils lateral; 1 preocular; temporals 1+1, rarely 2+2; 8 supralabials, 3rd, 4th and 5th touching the eye. Body slender; scales in 19 rows, more or less distinctly keeled, those of the outer rows often smooth. V. 174-217 (232); C. 86-107. In one of the types the anterior 4 subcaudals are single.

Hemipenis extending to the 8th caudal plate, not forked.

Coloration very variable. Olive-brown above, with small black spots; rarely a dorso-lateral series of white spots; frequently two white black-edged parallel lines, or an elliptic mark, on the nape, or a white black-edged streak on each side of the head or a black line from eye to gape; lips white or yellow, belly yellowish, with or without blackish dots, bordered

outside with bright red in life, frequently a black line or series of elongate blackish spots along each side of the belly; lower surface of tail frequently mottled with blackish, throat sometimes black

I have examined the types of *Natrix firsi*, both hatchlings, and regard them as conspecific with *N. platyceps*

Total length ♂ 880, tail 225, ♀ 735, tail 165 mm

Range The Himalayas from Kashmir in the west to Assam (Abor and Khasi Hills) in the east. A common snake in the Darjeeling district at between 5,000 and 6,000 feet

221 *Natrix beddomi*.

Spilotes vittatus Beddome, 1863, Madras Journ. Med. Sci. vi. p. 43 (Nilgiris London)

Tropidonotus beddomi Günther, 1864, Rept. Brit. Ind. p. 269, pl. xxii, fig. E (nom. nov. for *vittatus* proac.); Boulenger, F.B.I. 1890, p. 344 and Cat. Sn. Brit. Mus. i. 1893, p. 252; Wall, J. Bombay N. II. 8. xxvi, 1919, p. 560 — *Rhabdophis beddomi*, Wall, ibid. xxix, 1923, p. 605

Maxillary teeth 28 to 34, the last two abruptly and fairly strongly enlarged, nostrils lateral, 1 preocular; temporals 1+1 or 1+2, rarely 2+2, 8 or 9 supralabials, 3rd to 5th or 4th to 6th touching the eye. Body slender; scales in 19 rows, more or less distinctly keeled, the outer one or two rows smooth. V 140-150, C 62-82

Hemipenis extending to the 12th caudal plate, forked near the tip

Olive brown or brown above; a series of yellow spots, each one between two black spots or short transverse bars, along each side of the back, belly whitish, uniform or closely dotted with brown on the sides, labials yellow, the sutures edged with black, an oblique, yellow, black-edged streak from the eye to the gape usually present

Top of head in the young very light brown, speckled with dark brown on the vertex, and with a white or yellow transverse bar behind the parietals, in adult life the head becomes entirely brown, but the transverse bar usually persists

In the young the yellow spots upon the back are more in evidence than the black ones, in the adult the reverse is the case. In aged individuals the markings may be almost entirely lost, the back then being almost uniform brown in colour

Total length ♂ 525, tail 140, ♀ 690, tail 210 mm

Range The Western Ghats south of Mahableshwar (lat. 17° N). Wall states that it is common in the Nilgiris and the Wynnad at between 3,000 and 7,000 feet. It feeds chiefly upon frogs and toads.

222. *Natrix nigrocincta*.

Tropidonotus nigrocinctus Blyth, 1856, J. A. S. Bengal, xxiv, p. 717 (Pegu, Burma; Calcutta); Boulenger, F. B. I. 1890, p. 346, and Cat. Sn. Brit. Mus. i, 1893, p. 255; Smith & Kloss, J. Nat. Hist. Soc. Siam, i, 1915, p. 244; Smith, *ibid.* iv, 1922, p. 206.—*Rhabdophis nigrocinctus*, Wall, J. Bombay N. H. S. xxix, 1923, p. 606; Bourret, Serp. Indochine, 1936, p. 91.—*Natrix nigrocincta*, Smith, P. Z. S. Ser. B, 1938, p. 579.

Tropidonotus eisenhoferi Gyldenstolpe, 1916, Kungl. Sv. Vet. Ak. Hand. Stockholm. iv, p. 11, fig. (Muang Fang, N. Siam; Stockholm).

Pseudoxenodon fruhstorferi Werner, 1925, Sitz. Ber. Akad. Wiss. Wien, cxxxiv, p. 49 (Siam; Vienna); Smith, Ann. Mag. Nat. Hist. (10) i, 1928, p. 496 (= *nigrocinctus*).

Maxillary teeth 27 to 29; the last two strongly and abruptly enlarged; nostrils lateral; 1, sometimes 2, preoculars; temporals 2+2, rarely 1+2; 9, sometimes 8, supralabials, 4th to 6th touching the eye. Scales in 19 rows, with bidentate tips, all distinctly keeled except the outer row, which is usually smooth. V. 150–170; C. 80–97.

Hemipenis extends to the 8th caudal plate, forked for half its length.

Olive-green above on the anterior part of the body, browner posteriorly, with or without narrow black cross-bars, sometimes interrupted on the mid-line; whitish below, uniform or powdered with grey, or almost entirely grey, or whitish anteriorly, grey posteriorly; lips white with two black oblique stripes, one below the eye, the other from behind the eye to the angle of the mouth; nape and hinder part of head white in the young, edged with black in front, and with a broad black bar or chevron behind; the outer parts of the chevron may persist as an oblique bar on each side of the neck.

Total length: ♂ 880, tail 255; ♀ 840, tail 185 mm.

Range. Tenasserim and Burma as far north as Thandaung, Toungoo district; the whole of Siam. Bourret records it from Tong-King.

Natrix nigrocincta is widely distributed in Siam. I obtained specimens from three well-separated localities, and have recorded the following variations (1922).

Northern Siam and Pegu.

1 preocular. V. 161–170; C. 83–96. Adults with distinct cross-bars (13 exs.).

Peninsular Siam.

1 preocular. V. 150–157; C. 72–82. Colour as in the northern form (5 exs.).

S.E. Siam.

2 preoculars. V. 156–164; C. 74–84. Cross-bars indistinct or absent (4 exs.).

I kept two individuals for some months. They were active, graceful snakes of diurnal habits. They fed upon frogs and fish picking the latter out of the water, and bolting them with great rapidity.

223 *Natrix monticola*

Tropidonotus monticola Jerdon, 1853, J. A. S. Bengal, xxi, p. 530 (Wynad type lost). — *Tropidonotus monticola*, Boulenger, F. B. I. 1890, p. 345 and Cat. Sn. Brit. Mus. i, 1893, p. 259, Wall. J. Bombay N. H. S. xvi, 1918, p. 562. — *Rhabdophis monticola*, Wall. ibid. xxix, 1923, p. 607.

Maxillary teeth 33 to 35, the last two abruptly and strongly enlarged. Nostrils lateral, 1 preocular, temporals 2+2 or 2+3, 8 supralabials. 3rd, 4th and 5th touching the eye. Body rather stout. Scales in 19 rows, all distinctly keeled except the outer row which may be smooth. V. 136-144, C. 78-92.

Hemipenis extending to the 9th caudal plate, forked near the tip.

Green above, with broad black cross-bars or quadrangular black spots, interrupted by two series of light dorso-lateral spots or lines. Lower parts white, a white or yellow line or collar across the back of the head, a white dot on each side of the frontal pre- and postoculars and labials below the eye white. Throat and sides of neck yellow in life.

Total length ♂ 390, tail 118, ♀ 475, tail 150 mm.

Range. The Western Ghats from Talevadi, Goa Frontier, to Travancore. A comparatively rare species.

224 *Natrix chrysarga*

Tropidonotus chrysargus Bore, 1827, l'Ann. p. 531 (Java non aud.). Schlegel, Phys. Serp. ii, 1837, p. 312, pl. xii, figs. 6 & 7. Boulenger (in part), F. B. I. 1890, p. 345 and Cat. Sn. Brit. Mus. i, 1893, p. 258 and Rept. Malay Pen. 1912, p. 127. — *Rhabdophis chrysargus* Wall. J. Bombay N. H. S. xxx, 1923, p. 606 (in part). Angel Bull. Mus. H. N. Paris (2) i, 1929, p. 76. *Tropidonotus juncus* Cantor, 1847, Cat. Mal. Rept. p. 93 (Penang, London). Girard, U.S. Explor. Exp. Herp. 1858, p. 145, pl. xiii, fig. 1.

Maxillary teeth 27 to 35, the last two abruptly and fairly strongly enlarged. Nostrils lateral, 1 preocular, temporals 2+2 or 2+3, rarely 1+2, 9 supralabials, 3rd to 5th touching the eye, usually 6 infralabials touching the anterior genials. Body slender. Scales in 19 rows, all more or less strongly keeled, with bidentate tips. V. 155-165, C. 84-101.

Hemipenis to the 8th caudal plate, forked near the tip.

Olive brownish, greenish or greyish above with a dorso-

lateral series of short white or yellow transverse bars, edged outside and connected across the vertebral line, with black; lower parts whitish, usually with a black spot at the outer margin of each ventral shield (specimens from the Malayan region may have the ventrals heavily spotted with black); lips white, the colour continued backwards and forming a chevron upon the nape, this mark always distinct in the young; supraorbital shield sometimes white.

Total length: ♂ 650, tail 145; ♀ 715, tail 195 mm.

Range. Tenasserim and Siam as far north as lat. 19°; Kamchay Mts., Cambodia; the Malayan region.

As shown on pp. 288 and 305, the Himalayan and Hainan records of this snake are not correct, and in consequence its range is here much restricted.

I have not seen the specimens recorded by Angel from Chicng-Khoung, in Upper Laos.

225. *Natrix callichroma*.

Natrix chrysarga callichroma Bourret, 1934, Bull. Instr. Gen. Pub. Hanoi, April, p. 155 (Ba-vi, Tong-King; Paris).—*Rhabdophis chrysargus callichromus*, Bourret, Serp. Indochine, 1936, p. 101.
Natrix auchenia Smith, 1939, P. Z. S. p. 580 (Hainan; London).

Like *chrysarga* in dentition and general scalation, differing as follows:—8 supralabials, 3rd, 4th and 5th touching the eye, and in the coloration of the head and neck. V. 152-159; C. 79-86.

Greyish-olive above, with indistinct, narrow black, transverse bars, intersected on the dorso-lateral line by short, whitish bars; lower parts whitish, lightly powdered with grey; lips white; a light patch on the head and nape immediately behind the parietals.

In addition there is a nuchal gland. The scales of the neck are not altered in shape or size, but on stretching the skin of that part, two parallel longitudinal areas of naked skin are exposed, the condition being as shown in the figure of *Balanophis ceylonensis*, p. 310. The areas are separated from one another by three series of scales and extend over a length of 9 scales; they are present in the type but cannot be found in the paratype of *auchenia*, nor in the type of *callichroma*. Beneath the naked areas lies the gland (sacculated type).

Range. Hainan (Five Finger Mountains); Tong-King (Ba-vi). Known from three specimens, all males.

I have examined the type of *N. chry. callichroma* in Paris and regard it as identical with my *N. auchenia*. The species has particular interest in that it combines the gland of the sacculated type with the external skin characters of the non-sacculated type.

Genus **BALANOPHIS.**

Tropidonotus Boulenger 1890 F B I p 341, and Cat Sn. Brit Mus. 1893 p 192
Rhabdophis Wall 1923 J Bombay N H S p 604
Balanophis Smith 1938 P Z S p 553 (type *Tropidonotus ceylonensis* Günther)

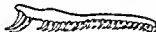
Maxillary teeth 24 to 26 followed by two enlarged, curved, grooved teeth anterior mandibular teeth feebly enlarged. Head distinct from neck eye large, with round pupil. Body moderately elongate scales in 10 rows, all except the outer row, strongly keeled ventrals rounded, tail moderate. Hypapophyses developed throughout the vertebral column. A nuchal gland of the non sacculated type.

A single species

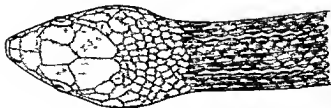
226 *Balanophis ceylonensis*

Tropidonotus chrysargus var. *ceylonensis* Günther 1858 Cat. Col. Sn. Brit Mus p 71 (Ceylon, London).—*Tropidonotus ceylonensis* Günther Rept. Brit. Ind. 1864 p 268 pl. xxii, fig. O, Boulenger F B I 1890 p 346, and Cat. Sn. Brit. Mus. i. 1893 p 252.—*Rhabdophis ceylonensis* Wall, Sn. Ceylon, 1921 p 103 and J. Bombay N. H. S. xxx 1923 p 605.—*Balanophis ceylonensis* Smith, P Z S 1938, p 553

Nostril between two nasals, internasals shorter than the prefrontals frontal longer than its distance from the end



A



B

Fig 98.—*Balanophis ceylonensis*
 A Maxilla B Head and neck, showing areas of naked skin.

of the snout; 2 pre- and 3 postoculars; temporals 2+2 or 2+3; 8 supralabials, 4th and 5th touching the eye; 4 infra-labials touching the anterior genials which are shorter than the posterior. V. 131-141; C. 40-54; A. 2.

The nuchal gland extends to about the level of the 15th ventral plate; the elongated areas of naked skin which overlie the gland are separated by 5 series of scales.

Olive-brown above, with more or less distinct reticulated, black cross-bars enclosing a dorso-lateral series of large yellow or reddish, black-edged spots; whitish or yellowish below, the tail speckled with grey; lips whitish; a dark brown stripe from behind the eye on to the neck. Interstitial skin scarlet, the colour showing up when the snake inflates its body.

Total length: ♂ 500, tail 110; ♀ 460, tail 95 mm.

Range. Peculiar to Ceylon. A hill species; only known from a few specimens.

Nothing appears to be known about its habits.

Genus PSEUDOXENODON.

Pseudoxenodon Boulenger, 1890, F. B. I. p. 340, and Cat. Sn. Brit. Mus. i, 1893, p. 270 (type *macrops*); Pope, Rept. China, 1935, p. 139; Bourret, Serp. Indochine, 1936, p. 111.

Maxillary teeth 20 to 28, increasing slightly in size posteriorly, the last two abruptly and much enlarged, and separated from the others by a slight interval, as in *Natrix subminiata* (fig. 95 C). Head distinct from neck; eye large, with round pupil. Body cylindrical; scales on the anterior part of the body disposed obliquely, keeled, without apical pits, in 19 or 17 rows; ventrals rounded; tail moderate; subcaudals paired.

Range. China; Indo-China; the Malay Peninsula; Java.

Eight species are known, the most widely distributed one being *macrops*. Three occur in the area covered by this work.

Key to the Species.

- | | |
|---|------------------------------|
| V. 151-180; C. 55-80; body without cross-bars. | <i>macrops</i> , p. 311. |
| V. 131-142; C. 42-52; above with 15-24 conspicuous broad black cross-bars | <i>bambusicola</i> , p. 313. |
| V. 135; C. 53; above with 33 small oblong red bars | <i>popei</i> , p. 314. |

227. *Pseudoxenodon macrops*.

Tropidonotus macrops Blyth, 1854, J. A. S. Bengal, xxiii, p. 296 (Darjeeling; Calcutta); Stoliczka, J. A. S. Bengal, xl, 1871, p. 436.—*Pseudoxenodon macrops*, Boulenger, F. B. I. 1890, p. 340, and Cat. Sn. Brit. Mus. i, 1893, p. 270; Venning,

- J Bombay N H S xx, 1910-1911 pp 340 and 772 Wall, b d xvi 1909 p 3rd and xix 1909 pp 341 and 898 Smedley Bull Raffles Mus no 5 1931 p 61 Pope Rept. China, 1935 p 151 Smith Rec Ind. Mus xii 1940 p 434 *Tropidonotus stikinnatus* Anderson 1871 J A. S Bengal xl, p 17 (Darjeeling Calcutta) *Tropidonotus angusticeps* Blyth (in part) 1854 J A. S Bengal xii p 293 (Darjeeling and Calcutta) Slater J A. S Bengal ix 1831 p 240 — *Pseudonotus angusticeps* Wall J Bombay N H S xxix 1923 p 608 Bourret Serp Indo chine 1936 p 111 Shaw & others J Darjeeling N H S v 1919 p 151 *Pseudonotus angusticeps uniformis* Bourret 1935 Bull Inst. Pub. Hano April p 263 (Tam dao an l Chapa. Tong Kng laria) an l Serp. Indoch. no, 1936 p 116

Maxillary teeth 25 to 27 nostril large between two nasals sut re between the internasals half or a little more than half that between the prefrontals loreal large a little longer than high 1 preocular not touching the frontal 3 postoculars 8 s parietals 4th and 5th touching the eye 7th highest temporals 2+2 genials well developed the anterior a little shorter than the posterior Scales in 19 19 or 17 16 rows, feebly or strongly keeled V 151-180 C 55-80 A 2 In the sexually mature male the keels on the caudal region develop strong tubercles

Remipennis extending to the 7th caudal plate forked at the 4th distal to the fork it is spinose except for a small area at the extreme tip which is calyculate the spines are fine but long proximal to the fork it is almost smooth, the sulcus lips are formed by two deep folds and two more run parallel with them

Brownish olivaceous or greyish above with or without a vertebral series of yellowish reddish brown or orange dark edged spots or short cross bars often placed obliquely and a dorso lateral series of black spots a more or less distinct chevron shaped mark on the nape pointing forwards present or absent yellowish below the anterior part of the belly with large triangular black or dark brown spots sometimes united to form cross bars posterior part of belly and tail speckled or clouded with black or dark grey

The dorsal markings are subject to considerable variation Wall (1909) giving an account of a large number of specimens all from the neighbourhood of Darjeeling writes — The ornamentation of this species is very varied and in some specimens extremely beautiful In a young example the head was slaty blue behind the nape bore a broad intensely black arrow head bordered behind with a narrower band of cinnamon In some specimens the head is a rich dark green in some the arrow head is billiard cloth green in others lilac and in others is completely absent In some the back is nearly uniformly olivaceous-green or brown In some the

series of dark costal spots is but obscure, in others very black or purplish. In some no trace of light cross-bars can be seen, in others they are more or less distinctly visible, in others very conspicuous, sometimes whitish, sometimes cinnamon, or the anterior whitish and the posterior cinnamon. Some specimens are chequered with green, black, amber and ochre spots. With all this variety of form, the specimens do not lend themselves to a grouping into colour varieties, for scarcely two specimens are quite alike.

Total length: ♂ 1160, tail 230; ♀ 1020, tail 200 mm.

Range. The Eastern Himalayas as far west as Nepal; Assam; the whole of Burma as far north as lat. 28° and south to Tenasserim (Taok plateau); Siam (Pa Meang in the extreme north); Annam (Langbian plateau); Malay Peninsula (Cameron Highlands).

Common in the neighbourhood of Darjeeling up to 5,000 and 6,000 feet. Rare in Indo-China south of lat. 20°. When excited it can flatten the neck in a marked degree.

Pseudoxenodon macrops sinensis (type locality Yunnan-Fu) differs from the typical form in having fewer ventrals (138-162), fewer subcaudals (57-68), and in having usually only 7 supralabials.

Wall's contention that the proper name of this snake is *angusticeps* because that name has page preference over *macrops* is not a correct interpretation of the Rules of Nomenclature. If names are of the same date, that selected by the first reviser shall stand (Art. 28); the first reviser in this case was undoubtedly Schlater (1891). See also H. W. Parker, P. Z. S. 1935, p. 524.

More material is needed before we can satisfactorily determine the status of the various members of this difficult genus. Pope, whose revision of it (1935) is the most complete yet attempted, includes six species. The differences between them are based largely upon coloration and this, as shown in *macrops*, can be most variable. The single specimen which I saw in Paris, collected by Bourret in Tong-King, and identified by him as *P. dorsalis*, is certainly not that species. I provisionally refer it to *bambusicola* Vogt; it has a scale formula of 19:17:15. V. 143; C. 51.

228. *Pseudoxenodon bambusicola*.

Pseudoxenodon bambusicola Vogt, 1922, Arch. Natur. Berlin, lxxxviii, A, 10, p. 138 (Mountains of N. Kwangtung); Pope, Rept. China, 1935, p. 140, fig.

Pseudoxenodon melli Vogt, l. c. s. p. 139 (Lungtow, N. Kwangtung); Smith, J. Nat. Hist. Soc. Siam, vi, 1923, p. 202.

I obtained a single specimen of this snake in Hainan; elsewhere it is known from China.

229 *Pseudoxenodon popoi*

Pseudoxenodon popoi Girard, 1938 Proc Biol Soc Washington, xl p 119 (Loi Mother Mountain, Hainan), and Peking Nat Hist Bull xv 1941 p 186, fig head

Known only from the type

Genus **MACROPISTHODON.**

Macropisthodon Boulenger 1893, Cat Sn Brit Mus i, p 263 (type *flaviceps*); and Rept Malay Pen 1912, p 128; De Rooij Rept In la Austral Arch ii 1917, p 91, Pope, Rept China 1933 p 161

Pseudopisthodon Van Denburgh, 1909, Proc Cal Acad Sci li, p 51 (type *carinatus*)

Tropidonotus (in part) Boulenger, 1890, F B I p 341

Maxillary teeth 11 to 18 followed by two very large backward pointing fangs, separated from the others by a short interval. Head distinct from neck, eye moderate, pupil round. Body rather stout, scales strongly keeled, in 19 to 27 rows with apical pits, ventrals rounded, tail rather short, subcaudals paired. Hypapophyses developed throughout the vertebral column.

Range The Malayan Region, India, Yunnan, China

The genus contains four species, two in the Malayan region, one in the Chinese and one in India. As already stated (p 282) it is closely allied to the *Rhabdophis* group of *Natrix*, from which it may have been derived. In *Macropisthodon* it would appear almost as if the development of the posterior fangs had passed the stage when they were really serviceable to their owner. They extend backwards almost in a straight line with the long axis of the maxillary bone, and it is only by extreme elevation of that bone that they can be brought into service. All the members of the genus have the habit of flattening the neck and fore part of the body and of adopting an erect cobra like attitude.

230 *Macropisthodon plumbicolor*.

GREEN KEELBACK

Tropidonotus plumbicolor Cantor, 1839, P Z S p 54 (type loc Malwa (Saugor) C1 drawing in Bodleian Lib Oxford); Boulenger, F B I 1890 p 351—*Macropisthodon plumbicolor*, Boulenger Cat Sn Brit Mus i 1893, p 267, Fletcher, Spol Zeyl v, 1908 p 99; Wall, J Bombay N H S xvi, 1905, p 390 and xvi 1906 p 1, col pl, and xxvi, 1919 p 583, and Sn Ceylon 1921 p 128, Fischer, J Bombay N H S xvi, 1906, p 527, Evans, ibid xx, 1911, p 1164, Prater, ibid xxx 1924 p 168, Smith, P Z S 1935 p 581, Fraser, ibid xxxix, 1937, p 471

Trigonocephalus ellioti Jerdon, 1853 J Asiat Soc Bengal xxii p 523 (type loc Nilgiri Hills)

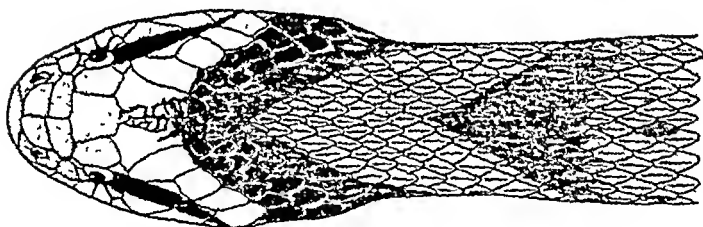
Xenodon viridis Dum. & Bib. 1854, Erp. Gen. vii, p. 763 (Indes Orientales; Paris).

Amphiesma brachyurum Jan, 1865, Arch. Zool. Anat. Phys. iii, p. 37, and Icon. Gén. Ophid. 1868, Liv. 29, pl. iii, fig. 2 (Sultanpur).

Maxillary teeth 11 or 12+2. Head rather broad and short; nostril between two nasals; internasal as long, or nearly as long, as the prefrontals; loreal often united with the lower preocular; 2 pre- and 3 or 4 postoculars; temporals 2+3; 7 supralabials, 3rd and 4th touching the eye; anterior genials shorter than the posterior. Scales strongly keeled, except the outermost row, in 23 or 25:25 or 27:17 or 19 rows; V. 144-162; C. ♂ 39-48, ♀ 34-43 (for specimens from India). In 21 or 23:21 or 23:17 rows. V. 154-153; C. ♂ 40-45, ♀ 37-47 (for specimens from Ceylon); A. usually divided. The scales



A



B

Fig. 99.—*Macropisthodon plumbicolor*.

A. Maxilla (B.M. 1930.5.8.266). B. Dorsal view of head and neck.

of the neck are variable in character; they may or may not indicate the presence of the gland below. In some individuals they are unaltered; in others a few scales are enlarged and paired, or there may be a vertebral series of very small scales.

Hemipenis extending to the 15th caudal plate, forked opposite the 9th. It is strongly plicate and spinose throughout, the spines gradually diminishing in size as they approach the tip. The vertebral gland is of the sacculated type and extends the whole length of the body. A full description of it is given in P. Z. S. 1938, l. c. s.

Grass-green above in life, becoming dull olive-brown (plumbicolor) in spirits. Juveniles have a large A-shaped

mark on the neck its apex forwards, reaching to the frontal shield and a second much smaller one behind, the intervening space being bright yellow or orange, a black stripe from the eye to the angle of the mouth and more or less regular transverse black spots or cross bars on the back and tail, belly whitish yellow or plumbeous rarely with darkish spots. With age the black markings entirely disappear.

Total length ♂ 485 tail 70 (750, Wall), ♀ 690, tail 85 (940 Wall) mm.

Range The whole of India except the Ganges Valley and the extreme north-west Ceylon.

Rare in the plains common in many hill districts, ascending to 7000 feet found usually among low vegetation or in grass it has been known to enter houses. In disposition, it is singularly gentle and inoffensive, when alarmed, it erects the fore body and flattens the neck like a cobra. Some specimens are very timid and flatten the whole body on the ground (Wall). Its chief food is toads.

Genus PARARHABDOPHIS

Pararhabdophis Bourret 1934 Bull. Gen. Instr. Pub. Hanoi March p 131 and Serp. Indochine 1936 p 120 (type *chapaensis*)

Maxillary teeth 32 followed without any interval by three much larger ones. Head distinct from neck, eye moderate, with vertically elliptic pupil nostrils lateral, between two nasals. Body cylindrical scales in 17 rows throughout, without apical pits subcaudals paired. Hypapophyses strongly developed in the posterior dorsal vertebrae.

The type specimen originally preserved in formalin, is now in a very bad state of preservation. The pupils, however, are undoubtedly vertical but for this character I should have placed it in the genus *Natrix*.

231 *Pararhabdophis chapaensis*

Pararhabdophis chapaensis Bourret 1934 (Chapa, Tang King, Paris)

Internasals nearly as long as the prefrontals, loreal longer than high 2 pre and 2 postoculars, temporals 1+1, 9 supralabials 4th 5th and 6th touching the eye, genials well developed, the anterior a little shorter than the posterior. Scales feebly keeled V 177, C 73 tail incomplete.

Hemipenis extending to the 6th caudal plate, not forked, spinose and calyculate throughout.

Dark brown above the scales of row 5 on each side with light centres forming two light dorso-lateral stripes,

brownish below, the outer margins of the ventrals lighter; lips whitish, the labials edged with brown.

Total length: 790, tail 160 mm.

Known only from the type-specimen.

Genus XENOCHROPHIS.

Xenochrophis Günther, 1864, Rept. Brit. Ind. p. 273 (type *cerasogaster*); Boulenger, F. B. I. 1890, p. 353, fig., and Cat. Sn. Brit. Mus. i, 1893, p. 191.

Maxillary teeth rather long, 20 to 25, subequal. Head fairly distinct from neck with angular canthus rostralis; eye moderate, with round pupil; nostril in a single nasal, directed upwards and outwards. Body cylindrical; scales in 19 rows, strongly keeled; without apical pits, ventrals rounded; tail moderate, subcaudals paired. Hypapophyses developed throughout the vertebral column.

A single species.

Range. As in the species.

232. *Xenochrophis cerasogaster*.

Peanimophis cerasogaster Cantor, 1839, P. Z. S. p. 52 (near Calcutta; col. sketch in Bodleian Lib.).—*Xenochrophis cerasogaster*, Günther, Rept. Brit. Ind. 1864, p. 274; Boulenger, F. B. I. 1890, p. 353, and Cat. Sn. Brit. Mus. i, 1893, p. 191; Wall, J. Bombay, N. H. S. xviii, 1907, p. 104, and xxix, 1923, p. 600.

Amphisma schistaceum Jan, 1865, Arch. Zool. Anat. Phys. iii, p. 236 (Indes Orientales).

Head narrow, elongate; rostral large, plate-like, about as broad as high; internasals narrowed anteriorly, nearly as long as the prefrontals; frontal long and narrow, constricted in the middle, where it is about as broad as the supraoculars. much longer than its distance from the end of the snout: loreal longer than high; 1 pre- and 2 or 3 postoculars: temporals 2+2 or 2+3; 9 supralabials, 4th touching the eye, 5th excluded by a subocular; genials elongate, the posterior pair the longest. Scales in 19:19:17 rows, the tips more or less distinctly bidentate. V. 140-154; C. 63-76; A. 2.

Hemipenis extending to the 12th caudal plate, forked near the tip; it is calyculate and spinose throughout, the cups being short and uniform in size; the spines project from the bases of the cups.

Olive-brown to green above, with or without more or less distinct darker spots; lower parts reddish, dappled with brown or purplish black, with small whitish spots, particularly on the fore-part of the body; a bright yellow line, white in the young, along the outer margins of the ventrals, bordered

above with chocolate and below, in life, with red, lips yellow edged with chocolate above, these two colours continuous with those upon the flanks

Total length ♂ 510 tail 120 ♀ 620, tail 140 mm.

Range L P (Fyzabad) Bengal, Assam (Khasi Hills, Goalpara)

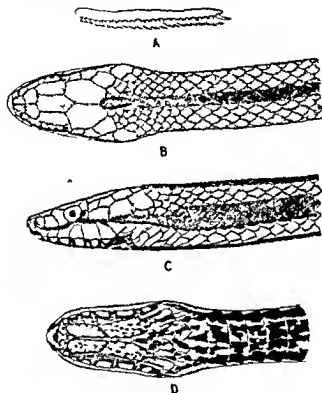


FIG 100—*Yemochrophis ceratogaster* A Maxilla. B C D Dorsal lateral and ventral views of head (B.M. 1907.2 14 2 10)

This strikingly handsome snake is almost entirely aquatic in its habits. Of its food, Wall (1907) writes "I found many with a material in *gastro* too digested to recognise until I found one with a freshly ingested shrimp when I realised from the colour, texture and fishy odour the true nature of the contents of other stomachs."

Genus ATRETIUM.

- Tropidophis* (non Coct. & Bib. 1843), Gray, 1849, Cat. Spec. Sn. Brit. Mus. p. 69 (type *schistosus*).
Atretium Cope, 1861, Pr. Acad. Nat. Sci. Philad. p. 299 (type *schistosus*); Günther, Rept. Brit. Ind. 1864, p. 272.
Helicops, Boulenger, 1890, F. B. I. p. 352, and Cat. Sn. Brit. Mus. i, 1893, p. 272 (in part); Pope, Rept. China, 1935, p. 159.

Maxillary teeth 19 to 24, posterior largest; head scarcely distinct from neck; eye rather large with round pupil; nostril valvular, directed more or less upwards, in a divided or semi-divided nasal; a single internasal. Body cylindrical; scales keeled, without apical pits, in 19 rows: ventrals rounded; tail moderate; subcaudals paired. Hypapophyses* developed throughout the vertebral column.

Range. Ceylon; India; Yunnan. Two species.

Key to the Species.

- A pair of prefrontals *schistosus*, p. 319.
 Three or four prefrontals [*yunnanensis*], p. 320.

233. *Atretium schistosus*.

OLIVACEOUS KEELBACK.

- Russell, 1801. Ind. Serp. ii, p. 5, pl. iv (no locality given).
Coluber schistosus Daudin, 1803, Hist. Nat. Rept. vii, p. 132 (based on Russell's plate).—*Atretium schistosus*, Günther, Rept. Brit. Ind. 1864, p. 273.—*Helicops schistosus*, Boulenger, F. B. I. 1890, p. 352, and Cat. Sn. Brit. Mus. i, 1893, p. 274; Wall, J. Bombay N. H. S. xvi, 1905, p. 391, and xviii, 1907, p. 109, and xxi, 1912, p. 1009, col. pl., map, and xxix, 1923, p. 608, and Sn. Ceylon, 1921, p. 135.
Tropidonotus moestus Cantor, 1839, P. Z. S. p. 54 (Bengal: sketch in Bodleian Library).
Tropidonotus surgens Cantor, ibid. p. 54 (Bengal: sketch in Bodleian Library).

Rostral broader than high, visible from above; internasal longer than the suture between the prefrontals; frontal twice as long as broad, much longer than its distance from the end of the snout, not twice as broad as the supraocular; loreal about as long as high; 1 pre- and 2 or 3 postoculars; temporals 2+2; 8 or 9 supralabials, 3rd and 4th, or 4th and 5th, touching the eye; anterior genials shorter than the posterior. Scales in 19:19:17 rows, more or less distinctly

* Absent in the American *Helicops carinicauda*, type of the genus *Helicops*, and in most other species of the genus, but present in *H. angulatus* and *H. polylepsis*. A reconsideration of the whole genus is indicated, or perhaps the abandonment of the character for that genus as in *Chrysopelea*. Pending revision, the genus *Atretium* is here restricted to Asia. See also Pope, l. c. s. and Bogert, Bull. Amer. Mus. Nat. Hist. lxxvii, 1940, p. 36.

keeled the keels strongest on the posterior part of the body and tail V 129 160 C 53-85, A 2

Hemipenis forked at the junction of the distal $\frac{1}{2}$ and proximal $\frac{1}{2}$, spinose and calyculate throughout, the calyces are thick walled and present a honeycomb appearance, the spines are small and on the floor of the calyces

Olive brown or greenish above, uniform or with two series of small black spots along the back, a more or less distinct dark lateral streak sometimes present, upper lip, outer row of scales and lower surfaces yellow According to Wall, specimens from Southern India have a reddish line down the body on scale rows 5 and 6

Total length ♂ 550, tail 160; ♀ 800, tail 185 mm

Range Ceylon India (Anaimalais, Wynad, Mysore, U P, Orissa) Common in Ceylon and at Bangalore (Wall)

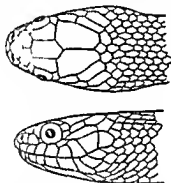


Fig 101 — *Atretium schistosum*

A. schistosum inhabits the plains and plateaus up to 3 000 feet altitude It is quiet and inoffensive in disposition and diurnal in its habits Although liking a moist environment, it is seldom found actually in the water, and at times ascends low bushes, it feeds upon frogs and fish When alarmed the fore part of the body is raised and the neck flattened, sometimes the whole of the body Wall records a couple taken in copula at Bangalore on August 27th, from 12 to 30 eggs are laid at a time

234 [*Atretium yunnanensis*]

Atretium schistosum var *yunnanensis* Anderson, 1879 Anat. Zool Res W Yunnan, p 822 (Munz & Hothel, W Yunnan, Calcutta)

Helicops yunnanensis, Pope, Rept China, 1935, p 159, fig. head

Range Western Yunnan.

Genus **TRACHISCHIUM.**

Trachischium Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 30 (type *rugosum*); Boulenger, F. B. I. 1890, p. 284, and Cat. Sn. Brit. Mus. i, 1893, p. 297; Wall, J. Bombay N. H. S. **xxix**, 1923, p. 608.—*Trachyischium*, Berg, 1901, Comm. Mus. Nac. B. Aires, i, (8) p. 289.

Eminophis Werner, 1924, Sitz. Ber. Acad. Wiss. Wien, (1) **cxviii**, p. 55 (type *lineolata*).

Maxillary teeth 18 to 20, subequal. Head not distinct from neck; eye moderate, with rounded or vertically sub-elliptic pupil; nostril between two nasals, directed forwards

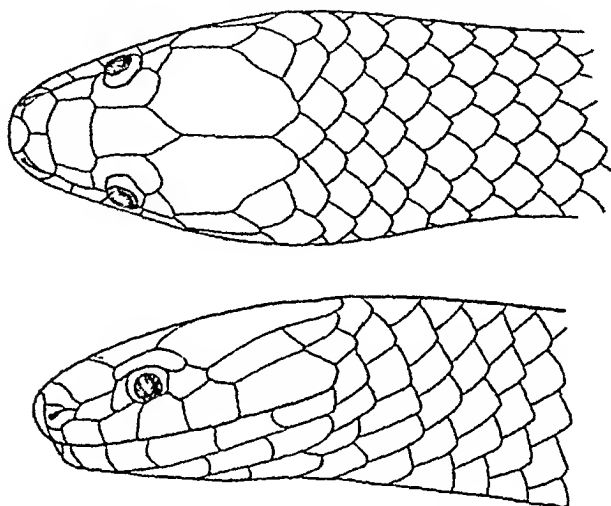


Fig. 102.—*Trachischium fuscum*. (B.M. 74.4.29.1179.)

and outwards; body cylindrical; scales smooth, keeled in the sacral region, in 13 or 15 rows throughout, without apical pits; ventrals rounded; tail short, subcaudals paired.

Common characters, unless otherwise stated:—Rostral as broad as high, or a little broader than high; internasals much shorter than the prefrontals; frontal twice or nearly twice as broad as the supraoculars, much shorter than the parietals; loreal twice as long as high; 1 preocular: 1 long anterior temporal; 6 supralabials, 1st smallest, 6th largest, 3rd and 4th touching the eye; 4 infralabials in contact with the anterior genials; anal undivided; hypapophyses developed throughout the vertebral column.

Hemipenis short, undivided, and spinous throughout, the spines being of almost uniform size and arranged in regular, longitudinal series.

Range. The Himalayas; Assam.

Diminutive snakes of gentle disposition, living generally under stones or fallen trees, and feeding upon worms, they lay from 3 to 6 eggs at a time

Key to the Species

- I Scales in 15 rows
Two prefrontals *monticola*, p 323.
- II Scales in 13 rows
Prefrontal single rarely divided: 1 postocular;
V 150-184 belly dark brown *fuscum*, p 323
Prefrontal single rarely divided: 1 postocular;
V 134-154 belly yellow *guntheri*, p 323
Two prefrontals 2 postoculars, 8 supralabials *tenascops*, p 323.
Two prefrontals 1 postocular, 8 supralabials *leve*, p 324.

235 *Trachischium monticola*

Calamaria monticola Cantor, 1839, P Z S p 80 (Naga Hills, London, sketch in Bodleian Library) — *Trachischium monticola* Boulenger, F B I 1890 p 288, and Cat Sn. Brit Mus i, 1893 p 299 and *ibid* lii, 1896, p 612; Wall, J Bombay N H S xvi 1907 p 322, and xix, 1909, pp 343 618, and xix, 1923, p 609 Annandale Rec Ind Mus 1912, p 45.
Ablabes albiventer Günther, 1875, P Z. S p 251 (Darjeeling; London)

Cyclophis rubicenter Jerdon, 1870, Fr A. S Bengal. p 80 (Khasi Hills, Assam: type lost)

Two prefrontals, two postoculars, rarely united; temporals 1+1, anterior genials a little longer than the posterior
Scales in 16 rows, those of the sacral region quite smooth
V 113-125, C 26-40

Light or dark brown above, with blackish longitudinal lines, and two more or less distinct reddish or light dorso-lateral stripes, yellowish below, a yellow spot on either side of the neck present or absent

Total length 225, tail 25 mm.

Range Assam (Hills north and south of the Bramaputra); Bengal (Barakar) Common in the hills of Assam

236 *Trachischium fuscum*.

Calamaria fusca Blyth, 1854, J A. S Bengal, xlii, p 288 (Darjeeling type lost) — *Trachischium fuscum*, Günther, P Z S 1860, p 161, Boulenger, F B I. 1890, p 285, and Cat Sn. Brit Mus i, 1893, p 297, Annandale, J A S Bengal, 1904, p 208, Wall, J Bombay N H S xix, 1909, p 342, and xix, 1923, p 608, Shaw & others, J Darjeeling N H S xlii, 1939, p 163

Calamaria obacero-striata Blyth, 1854, J. A. S Bengal. xlii, p 288 ("Rangoon type lost")

Trachischium ruforum Günther, 1858, Cat Col Sn Brit Mus p 30 (Sikkim, London)

Ablabes nigriticus Annandale, 1905, J. & Pr A. S Bengal, i, p 210 (Gülgit Kashmir Calcutta), Wall Rec Ind. Mus 1919, p 147

Eminophis lineolata Warner, 1924, Sitz. Ber. Akad. Wiss. Wien, Abt. i, cxxxiii, 1924, p. 55 (type loc. unknown: Vienna); Smith, Ann. Mag. Nat. Hist., (10) i, 1928, p. 496 (= *fuscum*).

A single prefrontal, rarely divided; 1 postocular; temporals 1+2; anterior genials twice, or nearly twice, as long as the posterior. Scales in 13 rows, those on the sides of the posterior part of the body and base of the tail distinctly keeled in the male, feebly keeled or smooth in the female. V. 150-165; C. 28-42.

Dark brown or blackish above and below, more or less iridescent, and with or without indistinct light longitudinal streaks above; the young are light brown above with dark longitudinal lines.

Total length: ♂ 325, tail 53; ♀ 480, tail 65 mm. (700 mm. Wall).

Range. The Himalayas from Gilgit, Loharganj and Garwhal districts in the west to Darjeeling district and Assam in the east.

Very common, according to Wall, in the neighbourhood of Darjeeling at between 5,000 and 7,000 feet.

237. *Trachischium guentheri*.

Trachischium guentheri Boulenger, 1890, F. B. I. p. 285 (Darjeeling; London), and Cat. Sn. Brit. Mus. i, 1893, p. 298, pl. xix, fig. 1; Wall, J. Bombay N. H. S. xix, 1909, p. 343, and xxix, 1923, p. 609; Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 154.

Like *fuscum* in head scalation; scales in 13 rows, strongly keeled in the male on either side of the vent. V. 132-154; C. 30-43.

Dark brown or reddish brown above, uniform or with indistinct lighter and darker longitudinal streaks; yellowish below (coral red in life), uniform or scantily mottled with brown. Young with an indistinct yellowish collar.

Total length: ♂ 308, tail 46; ♀ 420, tail 58 mm.

Range. Sikkim; Bengal (Darjeeling district).

Common in the neighbourhood of Darjeeling at between 3,000 and 7,000 feet.

238. *Trachischium tenuiceps*.

Calamaria tenuiceps Blyth, 1854, J. A. S. Bengal, xxiii, p. 288 (Darjeeling; Calcutta).—*Trachischium tenuiceps*, Boulenger, F. B. I. 1890, p. 286, and Cat. Sn. Brit. Mus. i, 1893, p. 299; Wall, J. Bombay N. H. S. xix, 1909, p. 343, and xxix, 1923, p. 609; Shaw & others, J. Darjeeling N. H. S. xiii, 1939, p. 154.

Two prefrontals; two postoculars; temporals 1+1 or 1+2; anterior genials not twice as long as the posterior; scales in 13 rows, keeled in the male on the sides of the vent. V. 125-140; C. 28-42,

The young are light brown above the scales with dark edges forming longitudinal lines. Adults are dark brown to blackish above yellow below (bright yellow or orange in life), tail mottled below with brown and with a brown medial line.

Total length 370 tail 60 mm (♀)

Range Nepal Sikkim, Bengal (Darjeeling district, Hills near Barakar)

239 *Trachischium lize*

Trachischium lize Peracca, 1904 Rev Suisse Zool. Geneva, xii, p. 66. (India Orientales. Geneva)

Trachischium gunquelabensis Wall, 1911 J. Bombay N.H.S. xxi, p. 401 (Muktesar 7500 feet W Himalayas. London no type from Naini Tal dist., Calcutta) and xxix, 1923, p. 609

Two prefrontals 1 postocular, temporals 1+2. 5 supra-labials the last very long anterior genials not twice as long as the posterior scales in 13 rows strongly keeled in the male on either side of the vent V 141-147, C 29-39

Olive above yellowish below, posterior half of belly and tail uniform or mottled with grey

Total length ♂ 305 tail 50, ♀ 450, tail 60 mm.

Range Western Himalayas (Muktesar and near Naini Tal)

Genus *PLAGIOPHOLIS*

Plagiopholis Boulenger 1893 Cat. Sn. Brit Mus. L, p. 301 (type *blakemoysi*) Wall, J. Bombay N.H.S. xxix, 1923, p. 610

Trachinopholis Boulenger 1893 Cat. Sn. Brit Mus. L, p. 419 (type *nuchalis*) Wall, J. Bombay N.H.S. xxix, 1923, p. 612 Pope Rept. China, 1935, p. 178

Maxillary teeth 16 to 20, small equal, head not distinct from neck nostril between two nasals, or between them and the first labial, eye moderate with vertically subelliptic pupil loreal present or absent, body short stoutish, cylindrical scales smooth more or less oblique without pits, in 16 rows throughout, ventrals rounded, tail short, subcaudals single or paired. Hypapophyses developed throughout the vertebral column. In all the species the mental is in contact with the anterior genials.

Range Burma Tong King, S. China.

Four species are known, three are included in this volume, the fourth, *P. styani*, inhabiting China.

In having distinctly oblique dorsal scales and no loreal delimiters and *styani* connect *Plagiopholis* with *Trachinopholis* and I have no hesitation in uniting the two genera. The character of the nostril is variable. The peculiar hemipenis of *blakemoysi* is foreshadowed in that of *nuchalis*.

The little that is known of these snakes shows that they are oviparous and feed chiefly upon worms.

Key to the Species.

I. No loreal.

Scales scarcely oblique; 5 supralabials, 3rd touching the eye; T. 1+1 *blakewayi*, p. 325.

Scales distinctly oblique; 6 supralabials, 3rd and 4th touching the eye; T. 1+2 *delacouri*, p. 326.

II. A loreal.

Scales distinctly oblique; 6 supralabials, 3rd and 4th touching the eye; T. 1+2 *nuchalis*, p. 326.

240. *Plagiopholis blakewayi*.

Plagiopholis blakewayi Boulenger, 1893, Cat. Sn. Brit. Mus. i, p. 301, pl. 19 (Toungyi, Shan States; London); Wall, J. Bombay, N. H. S. xxix, 1923, pp. 467, 610, and xxx, 1925, p. 810.

Trirhinopholis nuchalis, Wall, 1921, J. Bombay N. H. S. xxviii, p. 43.

Rostral broader than high, well visible from above; internasals broader than long, shorter than the prefrontals; frontal much longer than its distance from the end of the

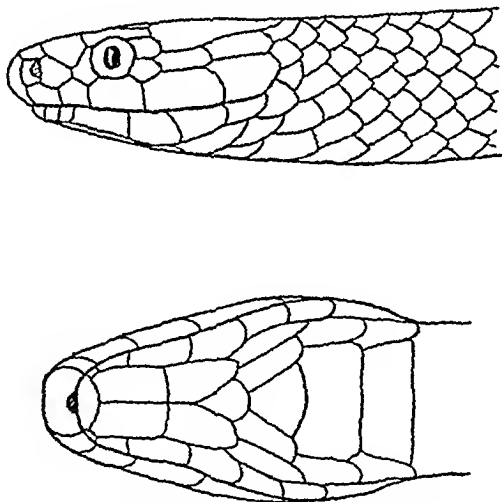


Fig. 103.—*Plagiopholis blakewayi*. (B.M. 1925.5.25.J1.)

snout, as long, or nearly as long, as the parietals; no loreal (Wall records it in one specimen), its position taken by the outer end of the prefrontal, which is wedged in between the posterior nasal and the preocular; 1 pre- and 2 postoculars; temporals 1+1 or the 2 united in one long shield; 5 supralabials, 1st and 2nd smallest, 3rd touching the eye, 4th usually the largest; 3 infralabials touching the anterior genials, which are a little longer

than the posterior Scales scarcely oblique, those of the sacral region feebly keeled in the male V. 124-132; C ♂ 23-31, ♀ 21 paired or some of them single, A. 1.

The hemipenis is not forked, but the sulcus bifurcates near the base of the organ, distal to the fork the organ is spinose, except at the tip, where it is calyculate.

Dark brownish or reddish above, some of the scales edged with black, and with two dorso-lateral, more or less distinct, series of small black spots, greyish or pinkish on the sides, yellowish (or pink in life) below, uniform or speckled with brown, or with the ventrals edged with brown; a black chevron on the neck present or absent; lips yellowish, the scales edged with black.

Total length 380, tail 37 mm (♀).

Range Burma (Kachin Hills, Southern Shan States)

241 *Plagiopholis delacouri*

Plagiopholis delacouri Angel, 1929, Bull Mus Hist Nat Paris, (2) 1 p 77 (Chieng kuang Upper Laos; Paris), Bourret, Serp Indochine, 1936, p 136

Trirhinopholis nuchalis, Smith, Ann Mag Nat Hist (10) vi 1930 p 481

Trirhinopholis styani (non Boulenger), Bourret 1936 Serp Indochine p 145, and Bull Gen Instruct, Pub Hanoi, Feb 1939 p 20

Differs from *biakewayi* as follows — Temporals 1+2, 6 supralabials, 3rd and 4th touching the eye, 5th and 6th largest Scales distinctly oblique V. 108-129, O. 20-26, paired

Yellowish or greyish brown above, a series of round, black, dorso lateral spots connected to each other by light transverse bars or chevrons a large black chevron pointing forwards on the nape, edged in front and behind with lighter, lower parts yellowish heavily spotted with dark brown, lips with black vertical bars

Total length 395, tail 45 mm (♀)

Range Upper Laos (Chieng kuang), Tong King (Chapa and Fan Si Pan Mts)

A rare species

242 *Plagiopholis nuchalis*

Trirhinopholis nuchalis Boulenger 1893, Cat Sn Brit Mus 1, p 419 pl xxxvii, fig 1 (Toungyi, S Shan States, London), and Ann. Mus Civ Genova, (2) xii, 1893 p 323, Smith, J Nat Hist Soc Siam 1915 p 165 and J Bombay N H S xiii, 1915 p 785, Wall, J Bombay N H S xxx, 1923 pp 467, 612, and xxx, 1923, p 811, and xxxi, 1926, p 561.

- Taylor, Pr. Acad. Nat. Sci. Philad. lxxxvi, 1934, p. 302.—
Plagiopholis nuchalis, Smith, Rec. Ind. Mus. xlii, 1940, p. 484.
Oligodon evansi Wall, 1913, J. Bombay N. H. S. xxii, p. 614, fig.
 (Toungyi, S. Shan States; Bombay), and *ibid.* xxvii, 1920,
 p. 175 (= *T. nuchalis*).

Differs from *blackwayi* as follows:—A squarish loreal; temporals 1+2; 6 supralabials, 3rd and 4th touching the eye, 5th largest. Scales distinctly oblique, those of the sacral region feebly keeled in the male. V. 122-142; C. 23-30, paired or some of the anterior shields entire; A. 1.

The hemipenis is forked for about half its length, but the bifurcation of the sulcus commences considerably further back; it is spinose throughout, except near the bifurcation of the sulcus, where there are longitudinal folds; at the extreme tip of the organ the spines are very small; they gradually increase in size as they approach the proximal area.

Blackish brown or reddish above, many of the scales edged with black; a dorso-lateral series of rounded black spots connected with one another by light brown cross-bars, or a dorsal series of obliquely placed, light brown, black-edged cross-bars or elongated spots; sometimes small white or yellowish spots forming a network; a broad black chevron on the neck, pointing forwards, with or without a pale edging; belly yellowish, more or less thickly speckled with black, and usually with large squarish black spots on either side; rarely the black spots are absent.

Total length: 450, tail 55 mm. (♂).

Range. Burma (Mahtum and Dinghputyang, north of the Triangle; Katha district, Kachin Hills, Mogok, Shan States, Toungoo district, Karen Hills); Siam north of lat. 13° (Chiangmai, Doi Ang-ka; Khun Tan; Sai Yoke district on the Burma-Siam border, north-west of Ratburi).

Wall records it from Burma at between 3,000 and 4,000 feet altitude; in Siam my specimens were obtained at 2,000 feet.

Genus RHABDOPS.

Grotea (not of Cresson, 1846) Theobald, 1868, Cat. Rept. As. Soc. Mus. p. 45 (type *bicolor*).

Rhabdops Boulenger, 1893, Cat. Sn. Brit. Mus. i, p. 300 (type *olivaceus*); Wall, J. Bombay N. H. S. xxix, 1923, p. 610.

Pseudocyclophis Boulenger, F. B. I. 1890, p. 299 (in part).

Maxilla rather short, with 10 to 12 small, subequal teeth. Head not distinct from neck; eye moderate or small, with rounded or vertically subelliptic pupil; nostril crescentic, in the nasal, or connected by suture with the first labial. Body cylindrical, elongate; scales smooth, without apical pits, in 17 rows throughout; ventrals rounded; tail moderate;

subcaudals paired Hypapophyses present throughout the vertebral column

Range Southern India Burma; Yunnan. Two species

Key to the Species

Two internasals two prefrontals	<i>olivaceus</i> , p. 324
One internasal one prefrontal	<i>bicolor</i> , p. 325

243 *Rhabdops olivaceus*

Alloates olivaceus Boulenger, 1863, Madras Quart J Med. Sci. vi p 4 (Olanantoidy Malabar District, London).—*Pseudocyclophis olivaceus* Boulenger, F B I 1890 p 300.—*Rhabdops olivaceus* Boulenger Cat du Brit Mus i, 1893, p 200. Wall. J Bombay N H 2 xxiv, 1912, p 564, and xxix, 1923, p 610.

Head depressed rostral large, much broader than high, well visible from above suture between the internasals shorter than that between the prefrontals; frontal large, nearly as broad as long, 3 to 4 times as broad as the supraocular; longer than its distance from the end of the snout, shorter than the parietals, loreal longer than high; 2 pre- and 2 postoculars temporals 1+1, long, narrow, 5 supralabials, 3rd touching the eye, 5th very long; posterior genials shorter than the anterior, usually separated from one another by scales { 206-215, C 62-74, A 2

Hemipenis undivided, spinose throughout, distally the spines are minute becoming gradually larger, and at the base of the organ are arranged in longitudinal series, parallel to the culus are two prominent folds.

Olivaceous or yellowish brown above and below, with 4 longitudinal series of small black spots, 2 dorso-lateral and 2 lateral ventrals indistinctly edged with dark brown.

Total length 780, tail 120 mm (♀)

Range Western Ghats (Wynad)

244 *Rhabdops bicolor*.

Culemaria bicolor Blyth, 1854 J A S Bengal xxiv p. 239 (Assam).—*Alloates bicolor* Günther Rept Brit Ind 1864, p 276, (London, Zool Res W Yunnan 1879 p. 479.—*Groena bicolor* Thomsen Cat Rept Asiat Soc Mus 1883 p 45.—*Pseudocyclophis bicolor* Boulenger, F B I 1890 p 300.—*Rhabdops bicolor*, Boulenger Cat du Brit Mus i, 1893 p 201, Wall. J Bombay N H 2, xxv, 1912 p 638 and xxix, 1923 p 610, and xxx, 1926 p 810 and xxxi 1926 p 561 Pope, Rept China, 1935, p 176

Snout broadly rounded nostrils directed slightly upwards, rostral large, much broader than high, well visible from above internasals united into a single shield, scarcely shorter than the prefrontals, which are likewise united, frontal sub-

triangular in shape, as broad as, or broader than, long, four times as broad as the supraoculars, usually shorter than its distance from the end of the snout, much shorter than the parietals; loreal squarish or a little longer than high; 1 or 2 pre- and 2 or 3 postoculars; temporals 1+1, long and narrow; 5 supralabials, 3rd touching the eye or separated from it by the lower pre- and postoculars, 5th very long; posterior genials as long as the anterior, separated from one another by scales. V. 187-214; C. 63-77; A. 2.

Hemipenis as in *olivaceus* but without the longitudinal folds.

Dark brown or black above, yellowish-white below, the two colours strongly contrasted, but the line of demarcation, which

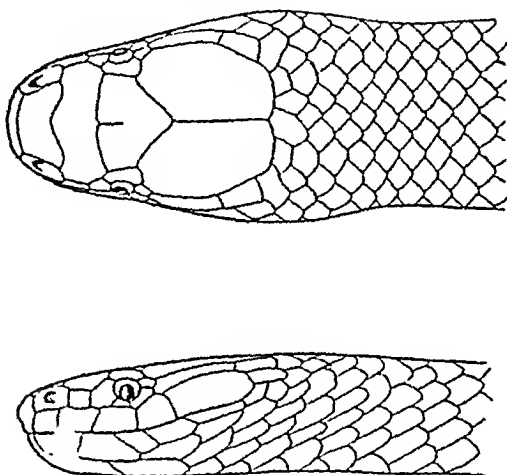


Fig. 104.—*Rhabdops bicolor*.

is upon scale rows 2 or 3, often very uneven in outline; tail uniform below, or spotted with black. Immature specimens may have the dorsal scales edged with black, forming longitudinal lines; in specimen B.M. 1935.10.12.10 from the Mishmi Hills, the dark colour of the back descends on to the flanks in a series of V-shaped marks.

Total length: ♂ 600, tail 125; ♀ 675, tail 145 mm.

Variation:—There is considerable irregularity in the scalation of the head; the internasals may be partly united with the prefrontals or the latter with the frontal; one example has an azygous shield between the prefrontals.

Range. Assam (Khasi and Mishmi Hills); Burma (Kachin Hills); Western Yunnan.

Found in the hills; it feeds on worms and slugs.

Genus **OPISTHOTROPIS.**

- Opisthotropus* Günther, 1872 Ann Mag Nat Hist (4) ix, p 16 (type *ater*); Boulenger, Cat Sn Brit Mus I, 1893, p 283, Pojo, Rept China 1935, p 164; Bourret, Serp Indochine, 1936, p 125
Calamohydus Boulenger, 1888, Ann Mag Nat. Hist (6) v, p 44 (type *andersoni*)
Helicospoides Mocquard 1890, Le Naturaliste, p 154 (type *typicus*)
Trimerodyles Cope, 1893, Pr Acad Nat Sc Phila, p 426 (type *balteatus*)
Tapinophis Boulenger, 1899, P Z S p 164 (type *latouchi*)
Liparophis Peracca, 1904, Rev. Suisse Zool. xii, p 863 (type *bolaii*)
Cantonophis Werner, 1900, Jahrb Nat Würtemb lrv, p 57 (type *prefrontalis*)
Paratapinophis Angel, 1929, Bull Mus Hist. Nat Paris, (2) i, p 77 (type *premaxillaris*). Bourret, Serp Indochine, 1936, p 132
Parahelvops Bourret 1934, Bull Instr Pub Gen. Hanoi, May, p 170 (type *annamensis*)

Maxillary teeth small, 20 to 40 in number, subequal, or the last two slightly enlarged Head not or scarcely distinct

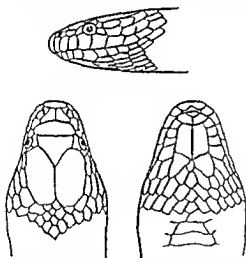


Fig 105 — *Opisthotropus spenceri* (After Smith)

from neck, eye moderate or small, with rounded or vertically subelliptic pupil, nostril in the nasal, directed upwards and outwards, prefrontal very broad, usually single Body cylindrical, scales smooth or keeled, without apical pits, in from 15-19 rows, ventrals rounded, tail moderate, sub-

caudals paired. Hypapophyses developed throughout the vertebral column.

Common characters unless otherwise stated:—Head depressed; snout broadly rounded; rostral broader than high, just visible from above; prefrontal at least twice as broad as long, forming a long suture with the frontal, which is two to three times as broad as the supraoculars; anal divided.

Range. Siam and French Indo-China north of lat. 18°; Southern China; Hainan; Borneo; Sumatra.

Eleven species are known.

Key to the Species.

I. Scales in 19 rows.

- V. 196-205; body banded *balteatus*, p. 331.
V. 149; body not banded *premaxillaris*, p. 332.

II. Scales in 17 rows.

- 10 or 11 supralabials *lateralis*, p. 332.
8 supralabials; internasals twice as long as broad, not touching the loreal *andersoni*, p. 333.
8 supralabials; internasals broader than long, in contact with the loreal *spenceri*, p. 333.

III. Scales in 15 rows.

- Scales smooth; 1 preocular *jacobi*, p. 333.
Scales keeled; 2 preoculars *annamensis*, p. 334.

245. *Opisthotropis balteatus*.

Trimerodytes balteatus Cope, 1895, Proc. Acad. Nat. Sci. Philad. xvi, p. 426, pl. 10 (Hainan: Harvard); Steindachner, Sitz. Ber. Akad. Wiss. Wien, cxv, 1906, 1, p. 905; Schmidt, Bull. Amer. Mus. Nat. Hist. liv, 1927, p. 438; Pope, Rept. China, 1935, p. 167, pl. vii, figs. E-H; Gressitt, Peking Nat. Hist. Bull. xv, 1941, p. 189.

Liparophis bedoti Peracca, 1904, Rev. Suisse Zool. xii, p. 664 (China; Geneva).

Opisthotropis multicincta Fan, 1931, Bull. Dept. Biol. Sun Yat Sen Univ. (11), p. 82, fig. (Lo-siang, Kwangsi Prov.).

Internasals about as broad as long; loreal as long as high, not touching the internasal; 1 pre- and 2 or 3 postoculars; temporals 1+2; 8 or 9 supralabials, 4th or 5th, or both, touching the eye; anterior genials shorter than the posterior, the latter diverging from one another. Scales in 19:19:17 rows, smooth anteriorly, more or less distinctly keeled posteriorly. V. 194-205; C. 69-99.

Hemipenis extending to the 9th caudal plate, spinose, the proximal spines being largest. There are three much enlarged basal spines set in a compact longitudinal row. The lips of the sulcus are spinose and are most conspicuous proximally. (Pope.)

Olivaceous or greyish above, yellow below, with black annuli which are broader than their interspaces above, and about as

broad below, they may be complete or alternate with one another on the mid-ventral line; each black annulus above is divided transversely in two by a yellow line; head blackish above with vertical yellow markings, one in front of, and one behind, the eye, a third at the angle of the mouth.

Total length ♀ 790, tail 145 mm.

Range Hainan, Southern China; Tong-King; Cambodia (fide Steindachner).

O. balteatus frequents mountain streams where it may be found under rocks. It is quick in its movements and does not bite when handled.

246 *Opisthotropis premaxillaris*.

Paralipinophis premaxillaris Angel, 1929 Bull. Mus. Hist. Nat. Paris, (2) 4, p. 75, fig. (Chuang Kuang Upper Laos, Yaculi, Bourret, Serp. Indochine, 1936, p. 132, fig. — *Opisthotropis premaxillaris* Pope, Rept. China, 1935, p. 164.

Head feebly distinct from neck; internasals nearly twice as long as broad, loreal as high as long, not touching the internasal, 1 pre- and 2 postoculars; temporals 2+2, 9 supralabials, 4th and 5th touching the eye, 6th prevented by the lower postocular, posterior genials nearly as long as the anterior. Scales in 19 19 17 rows, smooth. V 149, C 63 to 67.

Brown above, dirty yellowish below, lips whitish, margined with brown.

Total length 215, tail 50 mm.

Known only from the type.

247 *Opisthotropis lateralis*

Opisthotropis lateralis Boulenger, 1903, Ann. Mag. Nat. Hist. (7) 31, p. 350 (Man son Mts., Tong King, London). Pope, Rept. China, 1935, p. 171, fig. *Toponophis shun* Melli, 1930, Sitzb. Ges. Nat. Berlin, p. 321 (Yao-Shan, Kwangsi Province, China).

Internasals as broad as long, loreal longer than high, not touching the internasal, 2 pre- and 2 postoculars; temporals 1+2, 10 or 11 supralabials, 5th and 6th touching the eye; anterior genials longer than the posterior. Scales in 17 rows throughout, smooth anteriorly, more or less distinctly keeled posteriorly. V. 159-173; C 49-56.

Hemipenis extending to the 8th caudal plate, spinose proximally, with papilla like structures distally, the two areas merging into one another, proximal to the spinose area are two large basal spines (Pope).

Olive-brown above, with or without dark longitudinal lines

formed by a black edging to the scales ; ventrals and outer scale rows yellowish white.

Total length : ♀ 360, tail 55 mm.

Range. Tong-King (Man-son Mts.) ; S. China (Kwangsi Province).

248. *Opisthotropis andersoni*.

Calamohydus andersoni Boulenger, 1888, Ann. Mag. Nat. Hist. (6) ii, p. 44 (Hong Kong ; London).—*Opisthotropis andersoni*, Boulenger, l. c. a. (6) vii, 1891, p. 343, and Cat. Sn. Brit. Mus. i, 1893, p. 284, pl. 18 ; Wall, P. Z. S. 1903, p. 87 ; Pope, Rept. China, 1935, p. 166, fig.

Internasals twice as long as broad ; loreal twice as long as high, not touching the internasal ; 1 pre-, 1 post- and 2 suboculars ; temporals 1+2 ; 8 supralabials, 4th below the eye ; anterior genials much larger than the posterior ; scales in 17 rows throughout, feebly keeled. V. 168 : C. 58.

Olive-brown above, yellowish below.

Total length : ♂ 245, tail 45 mm.

Only known from the type-specimen.

249. *Opisthotropis spenceri*.

Opisthotropis spenceri Smith, 1918, J. Nat. Hist. Soc. Siam, iii, p. 13 (Muang Ngow, N. Siam ; London).

Internasals broader than long, in contact with the loreal, which is longer than high ; 1 pre- and 2 postoculars ; temporals 1+2 or 2+2 ; 8 supralabials, 4th and 5th touching the eye ; anterior genials larger than the posterior. Scales in 17 rows throughout, all smooth.

Olivaceous above, yellowish white below, the subcaudals mottled with grey.

Total length : ♀ 560, tail 150 mm. The type is 600 mm. in length but has a good deal of the tail missing.

Range. Known from two specimens, both from the type locality.

250. *Opisthotropis jacobii*.

Opisthotropis jacobii Angel & Bourret, 1933, Bull. Soc. Zool. France, xviii, p. 129 (Chapa, Tong-King-Yunnan border ; Paris) ; Bourret, Serp. Indochine, 1936, p. 128, fig.

Frontal five times as broad as the supraoculars ; internasals nearly twice as long as broad, not touching the loreal ; 1 pre- and 1 postocular ; temporals 1+1 ; 8 or 9 supralabials, 4th and 5th touching the eye ; anterior genials nearly twice as large as the posterior ; scales in 15 rows throughout, smooth. V. 159-179 ; C. 69-90.

Shining black above and below, the ventrals and subcaudals with light edges

Total length ♂ 540 tail 145 mm

Range Tong King, (Chapa Tam dao, Ngan son)

251 *Ophiotropis annamensis*

Parahelicops annamensis Bourret 1934, Bull Instir Pub Gen Hanoi May p 170 (Dana, near Tourane C Annam; Paris)
and Serp Indoch ne 1936 p 122 fig head

Maxillary teeth 25 the last two slightly larger than the others. Head slightly distinct from neck, internasals a little broader than long not touching the loreal, 2 pre and 3 post oculars, 8 or 9 supralabials, 4th and 5th touching the eye, 6th prevented by the lowest postocular, anterior genials shorter than the posterior. Scales in 17 15 15 rows smooth anteriorly, feebly keeled at mid body, strongly on the posterior part of the body and tail, V 169, C 123

Dark brown above with two dorso-lateral series of light, elongated spots very distinct on the anterior part of the body disappearing towards the posterior part, head dark brown above, with three more or less distinct light lines radiating from behind the eye, one to the border of the lip, another to the angle of the mouth and a third towards the top of the head light yellowish brown below, the outer margins of the ventrals spotted with brown

Total length 400, tail 160 mm.

Range Known only from the type specimen

Whilst recognizing the characters upon which Bourret has erected his genus *Parahelicops*, I believe the interests of taxonomy would be best served by extending the definition of *Ophiotropis*

Genus ASPIDURA

ROUGH SIDES

Aspidura Wagler 1830 Syst Amphib pp 132, 191 (type *Scy brachyrorus* Boie) Boulenger F R I 1890 p 238 and Cat Br Brit Mus I 1893 p 210 Wall, Sn Ceylon 1921, p 202 and J Bombay N H S xlix, 1923 p 611

Maxillary teeth 20 to 24, subequal. Head not distinct from neck, nostril between two small nasals and the first labial directed forwards and outwards, eye moderate, with round or vertically subelliptic pupil. Internasal single, no loreal. Body cylindrical, scales smooth, keeled or spinose in the male in the ischiadic region without apical pits, in 15 or 17 rows throughout. Ventrals rounded, tail short, subcaudals single or paired. Hypapophyses developed throughout the vertebral column.

Common characters, unless otherwise stated :— Rostral small, as high as broad or higher, just visible from above ; internasal large, as long as the suture between the prefrontals ; frontal

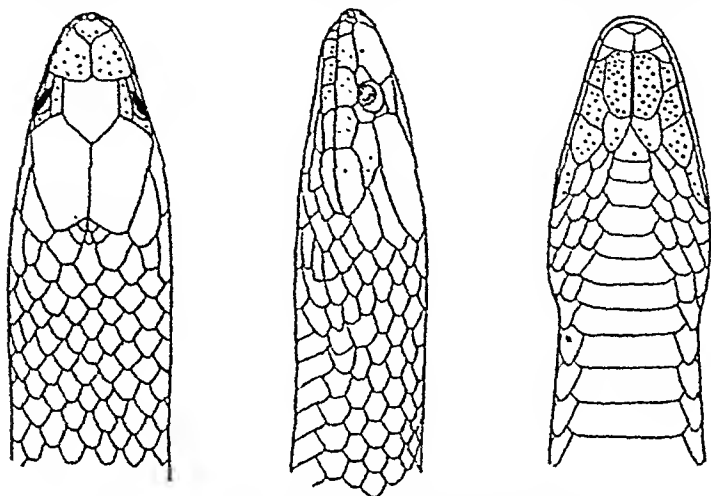


Fig. 106.—*Aspidura trachyprocta*. (B.M. 94.9.11.11-14.)

Dorsal, lateral and ventral views of head, shewing sensory tubercles.

large, 2 to 3 times as broad as the supraoculars, much shorter than the parietals ; temporals 1+2 ; 6 supralabials, 1st very small, 6th largest, 4th touching the eye ; 4 infralabials in

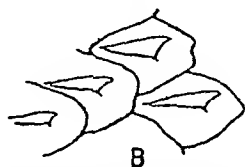
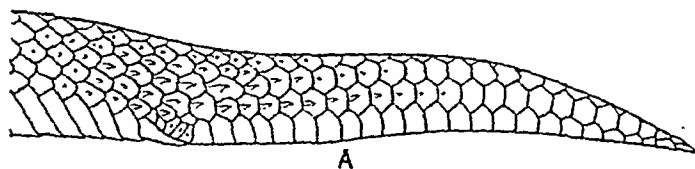


Fig. 107.—*Aspidura trachyprocta*. (B.M. 94.9.11.11-14.) A. Tail and ischiadic region, shewing spinose tubercles of adult male. B. Four scales magnified.

contact with the anterior genials ; 1st ventral in contact with the posterior genials ; anal single.

Hemipenis as in *Trachischium*.

Range Ceylon and the Maldive Islands

Five species are known. Diminutive, inoffensive snakes, living in soil or among fallen leaves, feeding upon worms and insect larvæ oviparous.

Key to the Species

I Scales in 17 rows

A. Both postoculars in contact with the parietal

A preocular, supraocular more than half the length of the frontal

brachyorrhus p. 236

No preocular, supraocular not half the length of the frontal, snout rounded

copii, p. 236

No preocular, supraocular more than half the length of the frontal, snout pointed

drummond kaysi, p. 238

B Only the upper postocular in contact with the parietal

A preocular snout pointed

guntheri, p. 238

II. Scales in 15 rows

A preocular

trachyproctis, p. 237.

252 *Aspidura brachyorrhus*.

Scytale brachyrrhoe Bosc 1827, *Isis*, p. 517 — *Aspidura brachyrrhoe*, Boulenger, F B I 1890, p. 285, fig. and Cat. Sn. Brit. Mus. 1, 1893, p. 311, Wall. Sn. Ceylon, 1921, p. 204, fig. head and J. Bombay N. H. S. xxix, 1923, p. 611.
Calamarius scytale Schlegel, 1837, *Phys. Serp.* n. p. 42 (based on Bosc's specimens of *S. brachyrrhoe*, Ceylon, Paris).

Snout rounded, frontal not twice as long as the supraocular, 1 preocular, 2 postoculars, both in contact with the parietal, anterior genials three times as long as the posterior, scales in 17 rows, those on either side of the vent feebly beaded in the male. V 139-155; C 27-38, angle.

Pale yellowish or reddish brown above, with four more or less distinct darker longitudinal streaks and a vertebral series of blackish dots, an oblique blackish stripe on each side of the nape, belly uniform yellowish, tail more or less abundantly speckled with brown.

Total length ♀ 360, tail 40 mm.

Range Ceylon. Found generally in the hills; common in the neighbourhood of Kandy. From 2 to 5 eggs are laid at a time.

253 *Aspidura copii*.

Aspidura copii Gunther, 1864, *Rept. Brit. Ind.* p. 203, pl. xviii, fig. E (Ceylon). Boulenger, F B I 1890, p. 289, and Cat. Sn. Brit. Mus. 1, 1893, p. 311, Wall. Sn. Ceylon, 1921, p. 204, and J. Bombay N. H. S. xxix, 1923, p. 611.

Snout rounded; frontal more than twice as long as the

supraoculars; no preocular; 2 postoculars, both in contact with the parietal; anterior genials twice as long as the posterior; scales in 17 rows, strongly keeled on the posterior part of the body and base of the tail in the male. V. 125-145; C. 20-35, usually all entire.

Brown above with two longitudinal series of large, black, pale-edged spots; a broad, oblique, black stripe on each side of the nape; lower surface yellowish, spotted or speckled with dark brown.

Total length: ♂ 415, tail 75; ♀ 405, tail 40 mm. (650 mm. Wall).

Range. Ceylon (Hills of the Uva and Central Provinces).

Not uncommon in the Balangoda district at about 4,000 feet. Wall records a specimen containing 21 eggs, 7 in one ovary, 14 in the other.

254. *Aspidura trachyprocta*.

Aspidura trachyprocta Cope, 1860, Proc. Acad. Nat. Sci. Philad., p. 75 (Ceylon); Günther, Rept. Brit. Ind., 1864, p. 203, pl. xviii, fig. F; Boulenger, F. B. I., 1890, p. 290, and Cat. Sn. Brit. Mus., i, 1893, p. 313; Laidlaw, Fauna Mald. and Lacc., 1902, p. 121; Fletcher, Spol. Zeylan, v, 1908, p. 98; Wall, Sn. Ceylon, 1921, p. 209, and J. Bombay N. H. S., xxix, 1923, p. 611.

Snout rounded or obtusely pointed; frontal not twice as long as the supraocular; a preocular, sometimes very small or absent; 2 postoculars, both in contact with the parietal; anterior genials 2 to 3 times as long as the posterior; scales in 15 rows, those on either side of the vent and at the base of the tail spinose in the adult male; scales of the chin of the male, particularly the anterior genials, with minute tubercles; scattered tubercles also present upon the shields of the snout. V. 125-150; C. ♂ 21-26, ♀ 12-18, single.

Light or dark brown, or blackish, above, with longitudinal series of small darker spots and a dark lateral streak, most distinct in the young; lower surface yellowish (yellow or red in life), spotted with black or with large quadrangular black spots, or entirely black.

Total length: ♂ 390, tail 40; ♀ 540, tail 35 mm.

Range. Ceylon (Hills of the Central and Uva Provinces).

Laidlaw records it from the Maldiv Islands (Male Atoll).

Exceedingly common in many hill districts in Ceylon at between 4,000 and 6,000 feet; recorded by Wall up to 7,000 feet. He states that the brilliant coloration is seen in both sexes. From 4 to 12 eggs are usually deposited, and breeding appears to go on throughout the year.

255 *Aspidura drummond-hayi*.

Aspidura drummond hayi Boulenger, 1904, Spid. Zeyl. is. p. 95, pl. — (Balangoda dist., Ceylon; London), Wall. Sn. Ceylon, 1921 p. 213, and J. Bombay N. H. S. xxix, 1923, p. 611

Head long and narrow, snout pointed, frontal not twice as long as the supraocular, no preocular; 2 postoculars, both in contact with the parietal, anterior genuals about twice as long as the posterior, scales in 17 rows, those on either side of the vent keeled in the male V. 112-120, C. 17-26, all paired or the anterior ones single

Light brown to dark grey above and below, strongly iridescent, uniform or finely speckled with lighter.

Total length ♂ 195, tail 30 mm

Range Known only from the type locality

256 *Aspidura guentheri*.

Aspidura guentheri Ferguson, 1878, P. Z. S. p. 819 (Coast of the W. Province Ceylon; London); Boulenger, F. B. I. 1890, p. 290, and Cat. Sn. Brit. Mus. I. 1893, p. 312, Wall. Sn. Ceylon, 1921, p. 208, and J. Bombay N. H. S. xxix, 1923, p. 611.

Snout obtusely pointed; frontal not twice as long as the supraocular, 1 preocular, 2 postoculars, only the upper in contact with the parietal, anterior genuals 3 times as long as the posterior, scales in 17 rows, those on either side of the vent feebly keeled in the male V. 101-116, C. 19-26, single

Light or dark brown above and below, the back with 3 longitudinal series of dark, light-edged dots, a vertebral and 2 lateral, head paler above, a yellow nuchal collar, interrupted in the middle and bordered with blackish in front and behind.

Total length ♀ 170, tail 20 mm

Range Ceylon (Coast of the Western Provinces, Balangoda district)

Genus BLYTHIA

Blythia Theobald, 1868 Cat. Rept. Anat. Soc. Mus. p. 44 (type *reticulata*); Boulenger, F. B. I. 1890, p. 287, and Cat. Sn. Brit. Mus. I. 1893, p. 313, Wall. J. Bombay N. H. S. xxix, 1923, p. 611

Aproasapulops Annandale, 1912, Rec. Ind. Mus. vii, p. 46 (type *anticurcurum*)

Maxillary teeth 20 to 22, those in the middle a little longer than the others. Head not distinct from neck, eye moderate, with rounded or vertically sub-elliptic pupil; nostril between two small nasals, or between them and the first labial, directed forwards and outwards, no loreal or preocular. Body

cylindrical; scales smooth, in 13 rows, without apical pits; ventrals rounded; tail short, subcaudals paired. Hypapophyses developed throughout the vertebral column.

A single species.

257. *Blythia reticulata*.

Calamaria reticulata Blyth, 1854, *J. A. S. Bengal*, xxiii, p. 287 (Assam; Calcutta).—*Blythia reticulata*, Theobald, *Cat. Rept. Mus. Asiat. Soc.* 1868, p. 44; Boulenger, *F. B. I.* 1890, p. 287, fig., and *Cat. Sn. Brit. Mus.* i, 1893, p. 314, and *Rec. Ind. Mus.* ix, 1913, p. 338; Annandale, *Rec. Ind. Mus.* viii, 1912, p. 45; Venning, *J. Bombay N. H. S.* xx, 1910, p. 336, and 1911, p. 771; Wall, *ibid.* xviii, 1908, p. 323, and xxix, 1923, p. 611; Smith, *Rec. Ind. Mus.* xlii, 1940, p. 484.

Aproaspidops antecursorum Annandale, 1912, *Rec. Ind. Mus.* viii, p. 46, pl. v, fig. 2 (Janak-mukh, Abor Hills; Calcutta).

Rostral as high as broad, visible from above; internasals half, or less than half, the length of the prefrontals: frontal

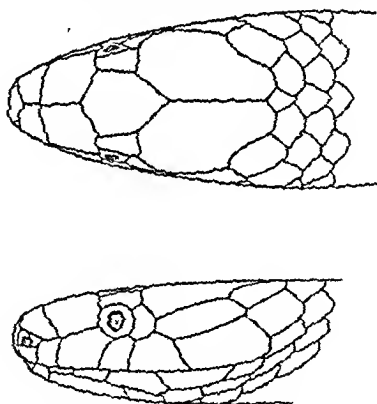


Fig. 108.—*Blythia reticulata*. (After Boulenger, *F. B. I.* 1890.)

large, nearly twice as broad as the supraoculars, much shorter than the parietals; 1 postocular; 1 long anterior temporal; 6 supralabials, rarely 5, 1st smallest, last largest, 3rd and 4th touching the eye; anterior genials at least twice as long as the posterior; 1st ventral in contact with the posterior genials. V. 127-155; C. ♂ 26-32, ♀ 18-24; A. 2.

Hemipenis undivided and spinose throughout, the spines being placed on folds of skin which are longitudinally arranged; at the distal end of the organ, and extending for about $\frac{1}{2}$ of its length, are two longitudinal folds.

Olive to blackish above, highly iridescent, the scales sometimes with light specks or borders; young with a white collar

interrupted on the vertebral line, disappearing more or less completely in the adult

Total length ♂ 315 tail 40, ♀ 410 tail 45 mm

Range Assam (Hills north and south of the Brahmaputra to Manipur) Burma (Htingnan in the Triangle, Sima south of Myitkyna Chin and Lushai Hills)

Oviparous

Genus HAPLOCERCUS

Haplocercus Gunther 1858, Cat. Col. Sn. Brit Mus p. 14 (type *crylonensis*) Boulenger P. B. I. 1890 p. 290 and Cat. Sn. Brit Mus 1, 1891 p. 309, Wall, J. Bombay N. H. S. xxix, 1923, p. 610

Maxillary teeth 10 to 12, large, those anterior a little longer than the others. Head not distinct from neck, eye moderate,



Fig. 109 — *Haplocercus crylonensis*

with round pupil, nostril between two nasals and the first labial, the latter shield being fused with the anterior nasal, a single internasal, no loreal, body cylindrical, scales

without apical pits, in 17 rows throughout; ventrals rounded; tail moderate; subcaudals single. Hypapophyses present throughout the vertebral column.

A single species.

258. *Haplocercus ceylonensis*.

Haplocercus ceylonensis Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 15 (Ceylon; London), and Rept. Brit. Ind. 1864, p. 204, pl. xviii, fig. G; Boulenger, F. B. I. 1890, p. 291, and Cat. Sn. Brit. Mus. i, 1893, p. 309; Wall, J. Bombay N. H. S. xxix, 1923, p. 610, and Sn. Ceylon, 1921, p. 143, fig. *Aspidura carinata* Jan, 1862, Arch. Zool. Anat. Phys. ii, p. 30, and Icon. Gen., Liv. 13, 1865, pl. 1, fig. 5 (Ceylon; Milan).

Rostral small, scarcely visible from above; internasal as long as the suture between the prefrontals; frontal longer than broad, usually shorter than its distance from the end of the snout, about twice as broad as the supraoculars; 1 preocular, pointed in front; 2 postoculars; temporals 1+2; 7 supralabials, usually only the 4th touching the eye; anterior genials twice as long as the posterior, 1st ventral in contact with the latter. Scales elongate, smooth on the neck, feebly keeled at midbody, strongly keeled on the posterior part of the body and tail. V. 174-207; C. 37-55; A. 1.

Hemipenis undivided, extending to the 8th caudal plate; it is spinose throughout, the spines being large and few in number, those adjacent to the sulcus are a little smaller than the others.

Brown above, with a black vertebral line, and on each side, a series of small black spots; an oblique, yellowish, black-edged bar on each side of the nape which may disappear in the adult; lower surface uniform yellowish. The young are light brown in colour above, with the vertebral line and dorso-lateral spots very conspicuously marked.

Total length: ♂ 370, tail 55; ♀ 440, tail 60 mm.

Range. Ceylon (Hills of Central, Uva and Sabaragamuwa Provinces). Common in the Balangoda district at between 3,500 and 4,200 feet altitude (Wall).

Genus XYLOPHIS.

Platypteryx (not of Laspeyres, 1803), Duméril, 1853, Mém. Acad. Sci. Fr. xxiii, p. 468, and Dum. & Bib. Erp. Gen. vii, 1854, p. 500 (type *perroteti*).

Xylophis Beddome, 1878, P. Z. S. p. 576 (type *indicus*); Boulenger, F. B. I. 1890, p. 283, and Cat. Sn. Brit. Mus. i, 1893, p. 303; Wall, J. Bombay N. H. S. xxix, 1923, p. 610.

Maxillary teeth small, 28 to 30, those in the middle a little larger than the others. Head not distinct from neck; nostril

between two small nasals, directed forwards and outwards; eye moderate, with rounded or vertically sub-elliptic pupil, loreal elongate, touching the eye; no preocular, anterior genials very large, in contact with the mental. Body cylindrical, scales smooth without apical pits, in 13 or 15 rows throughout, ventrals rounded tail short, subcaudals paired Hypapophyses developed throughout the vertebral column

Common characters, unless otherwise stated — Rostral small, as high as broad, frontal very large, 3 to 4 times broader than the supraoculars; 1 postocular; 1 long anterior temporal anterior genials very large, occupying most of the

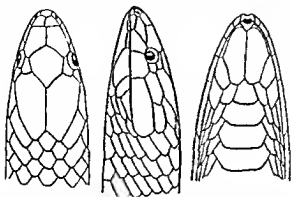


Fig 110 — *Xylophis perroteti*

chin and reducing the first three infralabials to narrow strips, posterior genials very small, in contact with one another or separated by a scale, first ventral in contact with the posterior genials, anal single

Range Hills of Southern India Two species are known

Key to the Species

Scales in 13 rows, supraocular larger than the postocular

perroteti, p 342

Scales in 15 rows supraocular not larger than the postocular

stenorhynchus, p 343

259 *Xylophis perroteti*.

Platypteryx perroteti Dum. & Bib 1854, *Erp Gen* vii, p 501 (Nilgurs, Paris); Jan, *Icon. Gen* 1865, *Lav* 12 pl 1, fig 1 — *Xylophis perroteti* Boulenger, *F B I* 1890 p 283 and *Cat Sn Brit Mus* 1, 1893, p 304, Wall, *J Bombay N H S* xvi, 1919 p 564, and xxix, 1923, pp 398, 610
Rhabdosoma microcephalum Gunther, 1858, *Cat Col Sn Brit*

Mus. p. 12 (Madras Presidency; London).—*Geophis microcephalus*, Günther, Rept. Brit. Ind. 1864, p. 200, pl. xviii, fig. A.

Internasals very small, the suture between them half the length of that between the prefrontals; loreal more than twice as long as high; supraocular much larger than the postocular; 5 supralabials, 1st very small, 2nd long and narrow, 3rd and 4th touching the eye, 5th largest. Scales in 13 rows. V. 139-147: C. ♂ 27-38, ♀ 16-20.

Hemipenis forked for $\frac{3}{4}$ of its length; it is flounced throughout, the folds on the distal part being oblique, gradually changing until at the fork they are transverse; proximal to the bifurcation there are smooth longitudinal folds; there are no spines.

Light or dark brown, with small darker spots longitudinally arranged or united to form stripes; sometimes with an ill-defined yellow collar; lower parts dirty yellowish, spotted with black, or almost entirely black.

Günther's type of *microcephalum* is uniform dark brown above and below, the scales on the posterior part of the body and tail having a yellow centre or tip.

Total length: ♂ 550, tail 70; ♀ 620, tail 40 mm.

Range. Western Ghats (Wynaad to Tinnevely).

260. *Xylophis stenorhynchus*.

Geophis stenorhynchus Günther, 1875, P. Z. S. p. 230 (Travancore; London).—*Xylophis stenorhynchus*, Boulenger, F. B. I. 1890, p. 304, and Cat. Sn. Brit. Mus. i, 1893, p. 304, pl. xx, fig. 1; Wall, J. Bombay N. H. S. xxix, 1923, p. 610.

Xylophis indicus Beddome, 1878, P. Z. S. p. 578 (Cumbam Valley, Madura, 5,000 feet; London).

Snout declivous and more pointed than in *perroteti*; internasals variable in size, sometimes very small, sometimes nearly as long as the prefrontals; loreal longer than in *perroteti*, often extending anteriorly nearly to the border of the mouth, reducing the second labial to a narrow strip; supraocular not or scarcely larger than the postocular; 5 supralabials, 1st minute, 5th largest, 3rd and 4th touching the eye. Scales in 15 rows. V. 108-132; C. 14-31.

Hemipenis deeply forked as in *perroteti*; the proximal end has transverse flounces; distally these are united and form calyces.

Dark brown above, uniform or with three rather indistinct darker longitudinal lines, and a yellowish collar; lower surfaces uniform dark brown.

Total length: 230, tail 20 mm.

Range. Western Ghats (Anaimalais to Tinnevely).

Genus *BOIGA*.

CAT SNAKES

Boiga Fitzinger 1826 *Neue Class Rept* pp 29 31, 60 (type *Coluber irregularis* Merrem), Werner, *Arch. Naturg Berlin*, 1924 (1925) xii, p 118, Wall, *J Bombay N H S* xix, 1924, p 873

Macrocephalus Fitzinger, 1843, *Syst Rept* p 27 (type *Dipsos draperii* Boie)

Gonyodipsas Fitzinger 1843, *l c s* p 27 (type *Dipsos irregularis*)

Dipsosaurus Fitzinger, 1843, *l c s* p 27 (type *trigonatus*); Boulenger, *Cat Sn Brit Mus nat*, 1896, p 59, Wall, *J Bombay N H S* xix, 1924, p 869, Werner, *Arch. Naturg Berlin*, 1924 (1925), ii, A, 12 p 118

Eudipsas Fitzinger 1843, *l c s* p 27 (type *dendrophila*)

Ophiodon Duméril 1853 *Prodr Class Ophid.* p 28 (type *cynodon*)

Triglyphodon Duméril 1853 *l c s* p 111 (type *irregularis*)

Taxicodryas Hallowell 1857, *Proc Acad Nat Sci Philad.* p 60 (type *blandingi*)

Pappophis Macleay, 1877, *Proc Linn. Soc N.S. Wales*, ii, p 39 (type *lateus-irregularis*)

Liophis Cope 1893, *Proc Acad Nat Sci. Philad.* p 427 (type *fuscus*)

Dipsas Boulenger F B I 1890, p 357

Maxillary teeth 10 to 14, subequal in size, followed by 2 or 3 enlarged, grooved fangs, palatine teeth often strongly enlarged ectopterygoid more or less distinctly forked

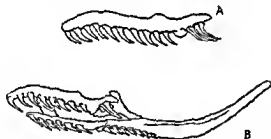
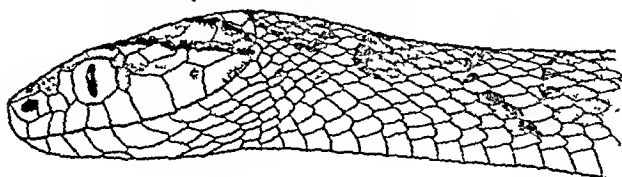


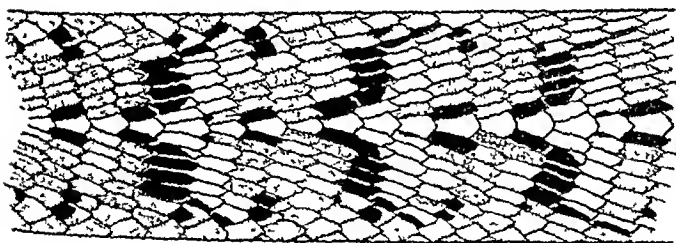
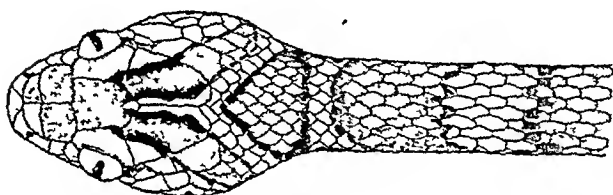
Fig 111.—*Boiga trigonata* A. Maxilla B Palato maxillary arch
C Two views of head (B.M 69 8 28 79-80) D Dorsal and lateral pattern.

anteriorly, the two branches articulating with the maxilla. Head very distinct from neck, eye large, with vertical pupil. Body more or less compressed, scales smooth, more or less oblique, with apical pits, in 19 to 29 rows, the vertebral series more or less enlarged, ventrals rounded or obtusely angulate laterally, tail moderate or long, subcaudals paired. Hypophyses present on the posterior dorsal vertebrae in all the Asiatic species.

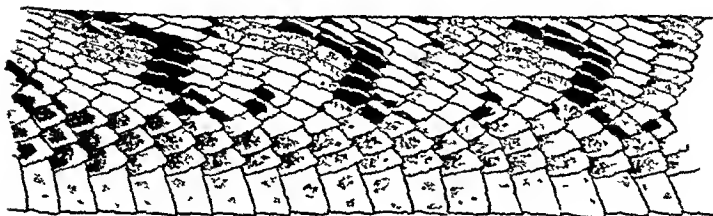
Common characters, unless otherwise stated :—Nostril between two nasals, the posterior more or less distinctly concave ; internasals shorter than the prefrontals ; frontal as broad, or nearly as broad, as long ; eye large, its diameter at least twice



C



D



its distance from the border of the mouth, equal to its distance from the nostril ; rostral small, squarish or pointed posteriorly ; 2, rarely 3, postoculars ; 8 supralabials, 4th, 5th and 6th touching the eye ; anal entire ; hemipenis not forked.

The apical pits may be single or paired. They are single in *multimaculata*, *ochracea*, *trigonata*, *gokool*, *ceylonensis*, *multifasciata* and *cymodon*. In the others they may be single or double, but there is no regular order in which they are arranged. *D. barnesi* not examined.

In all the members of this genus that I have examined, the anal sac, particularly in the female, is unusually long.

Wall, under *B. multifasciata* (1909), has commented upon what may occur in the members of this genus, namely, the division and reunion of the vertebral row of scales, so that the number of scale rows is alternately diminished and increased. I can confirm his remarks.

Range Southern Asia, Tropical Africa, Papuasia, Tropical Australia.

Some 25 species are known.

All the members of the genus included in this work are nocturnal and mainly arboreal in their habits. They prefer bushes and shrubs to high trees, and when at rest coil themselves into a ball rather than lie extended as do other snakes (*Ahaetulla*, *Dryophis*, *Chrysopelea*). As far as is known, all are oviparous. Most of them are extremely vicious in disposition, and their method of coiling the body and mode of attack has been described by Wall and is here given under *B. trigonata*. All those I know have the habit of "rattling" the tail when agitated. Their food, as one would expect from their arboreal habits, consists mainly of birds and their eggs, and the tree haunting lizards, in particular the members of the genus *Calotes*. They kill their prey by constriction.

Key to the Species.

I. Scales in 19 or 21 (23) rows.

A. Preocular not reaching the upper surface of the head.

Scales in 19 rows, body with large rounded spots.

Scales in 19 rows; body uniform brown above, V 271-246, C 89-107.

Scales in 21 rows, body uniform brown above, V 223-252, C 160-119.

Scales in 21 rows, vertebrals feebly enlarged, their posterior margins rounded or obtusely pointed, a dorsal series of branched spots.

Scales in 21 (19) rows, vertebrals strongly enlarged, their posterior margins truncate or concave, a dorsal series of branched spots.

multimaculata p. 347

ochracea Wall, p. 349
[p. 348]

ochracea ochracea,

trigonata, p. 349

gokool, p. 351

B. Preocular reaching the upper surface of the head.

Scales in 19 rows, 3 preoculars, V 208-220, C 98-100.

barnesi, p. 354

- Scales in 19 rows; hemipenis not spinous: V. 237-242; C. 118-120 *quincunciata*, p. 353.
- Scales in 19 or 21 (23) rows; hemipenis spinous; back with dark vertebral spots or transverse bars *ceylonensis*, p. 351.
- Scales in 21 rows; back with narrow black cross-bars and whitish vertebral spots *multifasciata*, p. 357.
- Scales in 21 rows; temporals small, scale-like; back with large elongated spots *multitemporalis*, p. 356.
- Scales in 21 rows; colour uniform green (brown in the juvenile) *cyanca*, p. 355.
- II. Scales in 23 to 29 rows.
- Scales in 23, rarely 25, rows; C. 122-157 *cynodon*, p. 357.
- Scales in 23 rows; C. 95-102 *dightoni*, p. 359.
- Scales in 25-29 rows; C. 102-119 *forsteri*, p. 358.

261. *Boiga multimaculata*.

LARGE-SPOTTED CAT SNAKE.

Russell, 1801, Ind. Serp. ii, p. 27, pl. xxiii (Java).

Dipsas multimaculata Boie, 1827, Isis, p. 549 (Java).—*Dipsas multimaculata*, Schlegel, Phys. Serp. ii, 1837, p. 265, pl. xi, figs. 4 & 5, and Abbild. Amphib. 1844, pl. xiv, figs. 13-15; Boulenger, F.B.I. 1890, p. 360.—*Dipsadomorphus multimaculatus*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 64; Wall & Evans, J. Bombay N. H. S. xiii, 1900, p. 346, and 1901, p. 615; Wall, ibid. xiii, 1901, p. 534, and xxix, 1924, p. 869, and xxx, 1925, p. 818, and xxxi, 1925, p. 564; Prater, ibid. xxxviii, 1935, p. 201.—*Boiga multimaculata*, Smith, J. N. H. S. Siam, vi, 1923, p. 203; Pope, Rept. China, 1935, p. 339, pl. xv, D-I; Bourret, Serp. Indochine, 1936, p. 311.

Boiga multimaculata hainanensis * Mell, 1929, Lingnan Sci. J. viii, p. 213.

Boiga multimaculata indica Mell, 1929, Lingnan Sci. J. viii, p. 213 (Continental India).

Maxillary teeth 9 or 10+2; anterior palatine teeth not strongly enlarged; 1, rarely 2, preoculars, not reaching the upper surface of the head; temporals 2+2 or 2+3; posterior genials as long, or nearly as long, as the anterior, usually in contact with one another. Scales in 19:19:15 or 13 rows, the vertebrae fairly strongly enlarged; V. 202-245; C. 80-109.

Hemipenis extending to the 10th-12th caudal plate; the distal half is calyculate, the cups being thick-walled and feebly scalloped; on the ventral surface there are a number of coarse spines; the spines are fleshy, only the tip being exposed; there are about 16 in lateral series; the proximal half is spineless.

Greyish brown above, with two alternating series of large, rounded or oval, dark brown, often light-edged, spots, and two other series of much smaller spots on the sides of the body; small vertebral spots may be present; two broad dark brown or black longitudinal stripes on the top of the

* Corrected to *sikiangensis* Mell, in his "Separate" sent to me.

head diverging posteriorly a longitudinal stripe or elongated mark on the nape and another from the eye to the angle of the mouth lower parts whitish marbled or spotted with brown and with a series of brown spots along each side

Total length ♂ 800 tail 190 ♀ 990, tail 190 mm

Pange Burma as far north as lat 22°, Assam (Sylhet), Siam and the adjacent islands of the Gulf as far south as lat 12° French Indo China Southern China Hainan Hong Kong

There is no evidence to show that it inhabits Tenasserim or Siam south of lat 12° or the Malay Peninsula but it occurs in Java Sumatra and Borneo

The Large spotted Cat Snake is not uncommon in northern Tenasserim Southern Burma and Central Siam, inhabiting forested localities It feeds on lizards (mainly *Calotes* species) and small birds In disposition it is fierce and bites readily when handled

262 *Boiga ochracea*

TAWNY CAT SNAKE

(*Boiga ochracea ochracea*)

Dipsos ochraceus Gunther 1868, Ann. Mag. Nat. Hist. (4) 1, p. 425 (Pegu London)

Dipsos hexagonatus (non Blyth) Stoliczka, 1871 J. A. S. Bengal, xl, p. 439 Anderson, P. Z. S. 1871 p. 185 (in part), Boulenger F. B. I. 1890 p. 361 (in part) — *Dipsadomorphus hexagonatus* (non Blyth) Boulenger Cat. Sn. Brit. Mus. iii, 1896 p. 65 (in part) Wall, Rec. Ind. Mus. iii, 1909 p. 154, and J. Bombay N. H. S. xix, 1909 p. 352 Annandale Rec. Ind. Mus. iii, 1909 p. 281

Dipsadomorphus stoliczkae Wall, 1909 Rec. Ind. Mus. iii, p. 155 (Darjeeling no type made) and J. Bombay N. H. S. xxix, 1923 p. 872 — *Boiga stoliczkae* Shaw Shedd & Barker J. Bengal N. H. S. xx, 1910 p. 68

(*Boiga ochracea walli*)

Dipsos hexagonatus (non Blyth) Stoliczka, 1870 J. A. S. Bengal xxxix, p. 198 pl. xi, fig. 4 Wall & Evans, J. Bombay N. H. S. xii, 1901 p. 615 — *Dipsadomorphus hexagonatus* (non Blyth) Wall, J. Bombay N. H. S. xxix, 1924 p. 870 and xxx, 1925 p. 818 and xxxi, 1926 p. 564, Vennung, ibid. xx, 1910 p. 342, Boulenger Cat. Sn. Brit. Mus. iii, 1896 p. 65 (in part), Annandale, Rec. Ind. Mus. iii, 1909 p. 281

Maxillary teeth 10 to 12+2, anterior palatine teeth not strongly enlarged, normally 1 preocular, not reaching the upper surface of the head temporals 2+2 or 2+3 anterior genials about as long as the posterior latter in contact with one another or separated by small scales, vertebrals strongly enlarged

Hemipenis as in *multimaculata*

Greyish reddish or yellowish brown above (1 coral red in life), some of the scales finely edged with black and forming

more or less distinct transverse lines or bars, best marked in the young; the vertebral series of scales sometimes lighter than the others; paler below; lips and chin whitish.

Total length: ♂ 1050, tail 235; ♀ 1100, tail 215 mm.

Two races:—

Boiga ochracea ochracea.

Scales in 21: 21: 17 rows. V. 223-252; C. 100-119.

Range. Eastern Himalayas (Sikkim, Darjeeling district, Buxar Duars); Assam (Goalpara, Sibsagar, Cachar). A common snake in the Duars.

Boiga ochracea walli, nom. nov.

Scales in 19: 19: 15 rows. V. 221-246; C. 89-107.

Range. Burma, south of lat. 25°; Tenasserim; the Andaman and Nicobar Islands.

Wall has pointed out (1909) that Blyth's *hexagonatus* is a juvenile specimen of *cyanea*, but his wish to retain the name *hexagonatus* by transferring the authorship to Stoliczka is not possible under the Rules of Nomenclature. The name *hexagonatus* must become a synonym of *cyanea*, and the next one available is Günther's *ochracea*. The type has 21 scale-rows and is therefore the Himalayan form, and the locality (Pegu) from which it is said to have come is no doubt an error. Beddome, from whom the specimen came, was never in Burma, and his localities have been shown to be incorrect on many occasions.

Wall's *stoliczkae*, with 21 scale-rows, therefore becomes a synonym of *ochracea ochracea*, and the Burma form is left without a name. I have pleasure in naming it after him. I regard it as a race of *ochracea*.

263. *Boiga trigonata*.

INDIAN GAMMA.

Russell, 1796, Ind. Serp. i, p. 20, pl. xv (Vizagapatam).
Coluber trigonatus Schneider, 1802, in Bechst. transl. Lacép. iv, p. 256, pl. xl, fig. 1 (Vizagapatam).—*Dipsas trigonata*, Blyth, J. A. S. Bengal, xxiii, 1856, p. 294; Blanford, J. A. S. Bengal, xlviii, 1879, p. 131; Boulenger, F. B. I. 1890, p. 358, and P. Z. S. 1891, p. 633; Wall, J. Bombay N. H. S. xvi, 1905, p. 307.—*Dipsadomorphus trigonatus*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 62; Wall, J. Bombay N. H. S. xviii, 1907, p. 120, and 1908, p. 543, col. pl., and xix, 1909, p. 267, and xxvi, 1910, p. 569, and xxix, 1914, p. 871, and Sn. Ceylon, 1921, p. 269; Ingridby, J. Bombay N. H. S. xxix, 1923, p. 129; Fraser, ibid. xxxix, 1937, p. 482; Shaw & Shebb., J. Darjeeling N. H. S. iv, 1930, p. 55; Shaw, Shebb. & Barker, J. Bengal N. H. S. xv, 1940, p. 64.—*Boiga trigonatum*, Nikolsky, Faune de la Russie, 1916, p. 187, pl. vi.
Dipsadomorphus trigonata var. *melanocephalus* Annandale, 1904,

- J A S Bengal ixms, p 202, pl 9, figs 3 & 4 (Perso-Baluchistan frontier Calcutta)
Coluber sagittatus Shaw 1802, Gen. Zool. iii, (2) p 526 (India; based on Russell's pl.)
Coluber catenularis Daudin, 1803, Hist. Nat. Rept vi, p 253, pl lxxv fig 2 (Bengal Paris)

Maxillary teeth 8 to 10+2, anterior palatine teeth not strongly enlarged. 1 preocular, not reaching the upper surface of the head. temporals 2+3, posterior genials as long as, or longer than, the anterior, separated from one another by small scales. Scales in 21-31 rows, vertebrae feebly enlarged.
 V 206-256 C 75-96

Hemipenis as in *multimaculata*

Light yellowish or greyish brown above, uniform, or speckled with darker, and with a vertebral series of large, light, black-edged, angular or A shaped, or Y-shaped spots, which may be connected to one another on the vertebral line, lower parts whitish, uniform or with small black spots on the outer margins of the ventrals. head with light symmetrical markings, sometimes black edged, viz., a median stripe starting from the frontal and diverging at the posterior end of the parietals, the two arms extending on to the neck, a light stripe from above the eye to the angle of the jaw.

Annandalea melanorhophus is based on three specimens with dark heads.

Total length ♂ 825, tail 140, ♀ 990, tail 180 mm.

Range Ceylon (Uva Province), the whole of the Peninsula of India, extending in the north-west to Baluchistan, the N.W. Frontier Provinces and Transcaspiæ, W Himalayas (Sabathu, Almora), Eastern Himalayas (Sikkim, Northern Bengal).

Wall (1908 and 1921) has given good accounts of the habits of this common Indian snake, and his colour plate is excellent. The following points are taken from his remarks —

In disposition, like other members of its genus, it is one of the most intrepid snakes I know. With no further provocation than being suddenly disturbed, it will assume an attitude of defiance and act boldly on the offensive. The attitude adopted is very characteristic. The head and forebody are raised well off the ground, the latter thrown into loops, more or less in a figure of 8, the head poised in the middle. Prior to the stroke the body is inflated and deflated with agitation, and the tail briskly vibrated. The stroke is delivered with great malice, the jaws open widely, and as soon as it is delivered the creature resumes its former attitude, only to strike again and again. It feeds mainly on lizards of the genus *Calotes*, but will also devour small birds and mammals, killing them by constriction. From 3 to 11 eggs are laid, the young when born measure between 237 and 260 mm in length. Females appear to grow much larger than males.

264. *Boiga gokool*.

EASTERN GAMMA.

Dipsas gokool Gray, 1834, Ill. Ind. Zool. ii, pl. 83, fig. 1 (Bengal; London); Boulenger, F. B. I. 1890, p. 360.—*Dipsadomorphus gokool*, Annandale, Rec. Ind. Mus. 1912, p. 49; Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 64; Wall, J. Bombay N. H. S. xix, 1910, p. 831, and xxix, 1924, p. 871; Shaw & Shebb., J. Darjeeling N. H. Soc. iv, 1930, p. 56; Shaw, Shebb. & Barker, J. Bengal N. H. Soc. xv, 1940, p. 64.

Closely related to *trigonata* of which it appears to be the Indo-Chinese representative. It differs in the following characters:—Maxillary teeth 9 to 12+2; 1 or 2 preoculars; posterior genials in contact with one another. Scales in 21 (19): 21 (19): 17 rows, vertebrals strongly enlarged. V. 219–232; C. 87–103.

Hemipenis extending to the 10th caudal plate; the distal half is calyculate, the cups being large, longer than broad, and finely scalloped with spinous edges; the proximal half is as in *multimaculata*.

Yellowish brown above, with a series of vertical Y-shaped or T-shaped markings on each side of the back, separated from one another by a light vertebral line; head with a large, arrow-shaped, brown, black-edged mark, longitudinally bisected; a black stripe from the eye to the angle of the mouth; lower parts whitish, with an almost continuous series of brown or black spots on each side of the ventrals; labials brown.

Total length: ♂ 800, tail 170; ♀ 870, tail 175 mm. Mr. P. E. Barker tells me that he obtained one 4 feet in length (1200 mm.)

Range. The Eastern Himalayas as far west as Darjeeling; Assam as far south as lat. 24° N.; Chittagong.

A common snake in the Duars. In disposition and habits like *trigonata* (Wall, 1910).

Variation:—A specimen labelled Chittagong (? Chittagong Hills) in the Bombay Coll. has only 19:19:15 scale-rows.

265. *Boiga ceylonensis*.

CEYLON CAT SNAKE.

Dipsadomorphus ceylonensis Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 176 (Ceylon; London); Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 66; Wall, Rec. Ind. Mus. 1909, p. 152, and J. Bombay N. H. S. xxvi, 1919, p. 570, and xxix, 1924, p. 870, and Sn. Ceylon, 1921, p. 278.—*Dipsas ceylonensis*, Günther, Rept. Brit. Ind. 1864, p. 314, pl. xxiii, fig. B; Boulenger, F. B. I. 1890, p. 359.

Dipsas nuchalis Günther, 1875, P. Z. S. p. 233 (West coast of India, London).—*Dipsadomorphus nuchalis*, Wall, Rec. Ind. Mus. iii, 1909, p. 153, and J. Bombay N. H. S. xxi, 1911, p. 279, and xxvi, 1918, p. 571, and xxix, 1924, p. 872.

Dipsadomorphus beddomei Wall, 1909, Rec. Ind. Mus. iii, p. 152 (Ceylon), and Sn. Ceylon, 1921, p. 282, and J. Bombay N. H. S. xxix, 1924, p. 870.

Dipsosaurus andamanensis Wall, 1909, Rec Ind Mus iii, p 153 (Andaman, Calcutta).—*Bunga andamanensis* Wall, J Bombay N H S xxix, 1924 p 873

Maxillary teeth 12 to 20+2 anterior palatine teeth not strongly enlarged 1 preocular, extending to the upper surface of the head often touching the frontals; temporals 3+3 or 3+4 *snout* variable, the posterior usually in contact with one another at least anteriorly Scales in 19 or 21 (rarely 23) rows vertebrals strongly enlarged V 214-267 C 90-133

Hemipenises as in *multimaculata*

Greyish brown above with a series of vertebral, dark brown, black edged or blackish transverse, rarely oblique, spots, sometimes continued or alternating, as transverse bars on the sides of the body Each vertebral spot covers from 5 to 8 scales, and usually each scale has a dark edging; nape with a dark blotch or transverse bar, sometimes broken up—usually a distinct dark streak from the eye to the angle of the mouth, lower parts yellowish white, speckled or powdered with brown, a more or less continuous series of dark brown spots on the outer sides of the ventrals generally present

Total length ♂ 1020, tail 240, ♀ 1315, tail 255 mm.

Wall, who has examined many more specimens than are available to me, states that the male appears to grow much larger than the female It must be remembered, however, that his conception of *ceylonensis* is restricted to Ceylon and southern India

He has divided *ceylonensis* into four forms, giving each one specific rank The differences between them are summarized in the following table —

Species	Max teeth	Scales	V	C	Range
<i>ceylonensis</i>	14-20+2	19 19:15 or 13	214-235	98-108	W Ghats, Ceylon.
<i>beddomes</i>	12-13+2	19 19 15 or 13	248-268	113-127	W Ghats, Ceylon.
<i>nuchalis</i>	14+2	21 (23) 21 (23) 15	214-251	90-108	Ganjam Dist W Ghats, Nepal, Assam
<i>andamanensis</i>	13+2	21:21 15	259-267	118-133	Andaman Is

These figures are confirmed by the material in the British Museum which I have examined, but, except for the differences in the number of scales round the body and the ventral and

caudal counts, I am unable to find any morphological characters by which to separate them; it is possible that more material will upset Wall's figures, and leave us with one extremely variable species and a number of races. The wide range in ventral and caudal counts cannot be correlated with sexual difference.

Range. Nearly all the specimens have been obtained in the Western Ghats and Ceylon, and in these regions it is not uncommon. Occasional individuals have been recorded from Ganjam, Berhampur in Orissa, Chitlong in Nepal, and Sibsagar and Northern Cachar in Assam. All of these latter have 21 scale-rows at mid-body and I am not satisfied that they are *ceylonensis*. The two specimens, both juveniles, from Nepal (Indian Museum) differ in having only two anterior temporals and a somewhat different colour-pattern, the vertebral spots being absent and in their place a series of transverse or oblique bars; this colour-pattern agrees with the specimen described by Wall (xxi, 1911) from Orissa. I have not seen the specimens mentioned by him from Assam or Ganjam. The form from the Andaman Islands is also referred to under *B. cyanea*.

266. *Boiga quincunciata*.

Dipsadomorphus quincunciatus Wall, 1908, J. Bombay N. H. S. xviii, p. 272, pl. — (Tinsukia, Assam; London; type lost), and xix, 1910, p. 832, and xxix, 1924, p. 869.—*Boiga quincunciata*, Smith, Rec. Ind. Mus. xlii, 1940, p. 484.

Maxillary teeth 11 or 12+2; anterior palatine teeth not strongly enlarged; loreal in one specimen united with the

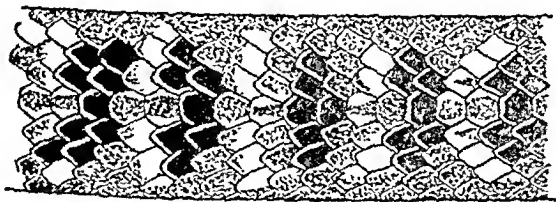


Fig. 112.—Dorsal pattern of *Boiga quincunciata*.

prefrontal; 1 preocular, reaching the upper surface of the head; temporals 2+3 or 3+3; posterior genials as large as or a little larger than the anterior, partly or completely separated by small scales. Scales in 19:19:15 or 13 rows, vertebrals fairly strongly enlarged. V. 237-253; C. 118-125; A. 1 or 2.

Hemipenis extending to the 10th caudal plate; reaching from the tip of the organ nearly to the base are two prominent.

folds, composed of large, fleshy, closely set, pointed papillae; between them and the sulcus are similarly-shaped papillae arranged in longitudinal series, but less closely set, in general appearance they resemble the fleshy spinose papillae which hemipenes of the other members of the genus have, but I am unable to detect any spines, the extreme tip of the organ is calyculate.

Yellowish or greyish brown above, finely speckled with dark brown and with a vertebral series of dark brown or black spots or blotches, each spot covers from 5 to 8 scales, and each scale is edged with white; between the spots are more or less distinct whitish areas, sides of the body speckled or spotted with brown, with or without a series of small, more or less distinct, brown spots, alternating with the vertebral ones, yellowish white below, thickly speckled with brown and with a more or less distinct series of white and brown spots on the outer margins of the ventrals; nape with three longitudinal stripes, top of the head brown, the frontal and parietals black, edged with white; a black stripe from the eye to the angle of the mouth.

Total length ♂ 1550, tail 365; ♀ 1260, tail 310 mm

Range Assam (Tinsukia and Rangara, both near Dibrugarh), Upper Burma (Hingnan, north east of Fort Hertz)

Known from four specimens, and the type.

267 *Bolga barnesi*.

Desaut barnesi Günther, 1869, P. Z. S. p. 506 pl. x. fig. 3 (Ceylon: London), Boulenger, F. B. L. 1890, p. 359—*Desaut barnesi* Boulenger, Cat. Sn. Brit. Mus. vi, 1896, p. 73, Wall. Sn. Ceylon, 1921, p. 283, and J. Bombay N. H. S. xix. 1924, p. 849

Maxillary teeth 13 or 14+2, anterior palatine teeth not strongly enlarged, eye three times as large as its distance from the mouth, longer than its distance from the nostril; 3 preoculars, the upper extending to the upper surface of the head, temporals 2+3, 8 supralabials, 4th and 5th touching the eye, the 3rd just excluded, anterior genials smaller than the posterior, latter completely separated by small scales. Scales in 19 19 15 rows, vertebrae feebly enlarged. V 208-220, C 99-100

Hemipenes as in *multimaculata*

Greyish brown above, with lighter, black edged, transverse spots, and a series of smaller black spots on each side, sometimes extending on to the ventrals; lower parts whitish, thickly powdered with brown, labials with black sutures; a dark stripe from the eye to the angle of the mouth, bordered above by a light one

Total length ♂ 650, tail 130 mm

Range. Ceylon (Gangaruwa).

Known from two specimens, the second being in the Colombo Museum. The type, which is the only one that I have seen, is a juvenile, and this probably accounts for the unusually large eye.

268. *Bolga cyanea*.

GREEN CAT SNAKE.

Triglyphodon cyaneum Dum. & Bib., 1854, *Erp. Gen.* vii. p. 1079 (type loc. unknown; Paris).—*Dipsas cyanea*, Boulenger, *F. B. I.* 1890, p. 361; Evans, *J. Bombay N. H. S.* xiii, 1901, p. 553; Wall & Evans, *ibid.* xiii, 1900, p. 188.—*Dipsadomorphus cyaneus*, Boulenger, *Cat. Sn. Brit. Mus.* iii, 1896, p. 72; Evans, *J. Bombay N. H. S.* xvi, 1904, p. 170; Wall, *ibid.* xviii, 1908, p. 329, and xix, 1909, p. 353, and *Rec. Ind. Mus.* iii, 1909, p. 154; Smith & Kloss, *J. Nat. Hist. Soc. Siam*, i, 1915, p. 246.—*Boiga cyanea*, Wall, *J. Bombay N. H. S.* xxix, 1924, p. 873; Smith, *Bull. Raffles Mus.* no. 3, 1930, p. 64; Bourret, *Serp. Indochine*, 1936, p. 317; Shaw, Shebb. & Barker, *J. Bengal N. H. Soc.* xv, 1940, p. 67.

Dipsas nigromarginata Blyth, 1854, *J. A. S. Bengal*, xxiii, p. 294 (Assam).

Dipsas hexagonatus Blyth, 1856, *J. A. S. Bengal*, xxiv, p. 360 (no type loc. given); ? *Stoliczka*, *ibid.* xxxix, 1870, p. 198 (in part).

Dipsas bubalina Günther, 1864, *Rept. Brit. Ind.* p. 311, pl. xxiv, fig. E (type loc. unknown; London); *Stoliczka*, *J. A. S. Bengal*, xl, 1871, p. 441.

Maxillary teeth 12 to 14+2; anterior palatine teeth not strongly enlarged; 1 preocular, reaching the upper surface of the head; temporals 2+3; posterior genials about as long as the anterior, in contact with one another or separated by small scales. Scales in 21:21:15 rows, vertebrals fairly strongly enlarged. V. 237-257, with a feeble lateral keel; C. 124-138.

Hemipenis extending to the 12th caudal plate; the distal half is calyculate, the cups being very large with scalloped, spinose edges; proximal to this there is a short area having 6-8 longitudinal series of thick, fleshy spines; the remainder of the organ has smooth longitudinal folds.

Green above; greenish white below, uniform or spotted with darker green; interstitial skin black; chin and throat blue in life.

The young when born are light brown or reddish or pinkish, with or without indications of dark cross-bars (*vide* Blyth and *Stoliczka*).

Total length: ♂ 1400, tail 340; ♀ 1860, tail 440 mm.

Range. Darjeeling district (Tindharia); Assam (Cachar, Sonapur, Monacherra); Burma (Maymyo, Rangoon district, Tavoy); Siam (Nakon Lampang, Dong Rek Mts. and islands

of the Gulf viz, Koh Pennan, Koh Pa Ngan), Cambodia (Bokor) Cochin China, Pulo Condore

The Green Cat Snake, in spite of its wide distribution, is nowhere common. It is sluggish in its habits and makes no attempt to escape when handled, but opens its mouth widely and remains on the defensive. With its green head, large golden brown eyes and the black inside to its mouth, it presents a strange sight. One that I kept in captivity ate in succession 5 snakes namely, 1 *Oligodon tenuis*, 2 baby *Ancistrodon rhodostoma*, and 2 *Trimeresurus albolabris*. The last viper was fully grown, and there must have been a long struggle between them, to judge by the appearance of the cage with everything scattered about in disorder.

The specimen in Boulenger's Catalogue, p. 72, labelled Darjeeling is *Boiga multifasciata*.

The literature concerning *Dipsos hexagonatus* by Blyth 1856 and 1863 and by Stoliczka 1870, is not as clear as it might be. Blyth apparently had five specimens, all juveniles. One is *Boiga cyanea* and may have come from Calcutta (fide Günther). It is described by Blyth as "bright ruddy ferruginous, inclining to coral red, paler below and mottled with black bordering some of the scales of the upper part". The other four which undoubtedly came from the Andamans are referred here to *Boiga ceylonensis*, for I cannot find any morphological character by which to separate them from that species.

269 *Boiga multitemporalis*.

Boiga multitemporalis Bourret, 1935 Bull. Gen. Instr. Pub. Hanoi, II, 8, p. 266 and Serp. Indochine 1935 p. 310, fig. head (Tam-dao Tong King; Paris).

Maxillary teeth 11 or 12+2, anterior palatine teeth not strongly enlarged. 1 or 2 preoculars, reaching the upper surface of the head, temporals small, scale-like, 4+5 or 6. 9 supralabials. 3rd, 4th and 5th touching the eye, posterior genials as long as the anterior, separated from one another by small scales. Scales in 21. 21. 17 rows, the vertebrales scarcely enlarged. V 240, C 139, A 2.

Light brown above, with a vertebral series of large elongated dark brown black-edged spots, and smaller and less distinct ones on the sides of the body, some of the vertebral spots are confluent with one another, thus forming a sinuous stripe, the scales of each spot are edged with black. belly whitish marbled or clouded with brown, head light brown above speckled with black, a round black spot on the middle of the nape.

Known only from the type-specimen, which is a male.

270. *Boiga multifasciata*.

HIMALAYAN CAT SNAKE.

Dipsas multifasciata Blyth, 1861, J. A. S. Bengal, xxix, p. 114 (Subathu, Simla: originally in Calcutta); Günther, Rept. Brit. Ind. 1864, p. 313; Stoliczka, J. A. S. Bengal, xxxix, 1870, p. 199, pl. xi, fig. 6, and xl, 1871, p. 440.—*Dipsadomorphus multifasciatus*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 69; Wall, Rec. Ind. Mus. i, 1907, p. 157, and J. Bombay N. H. S. xix, 1909, p. 352, and xxvi, 1919, p. 866, and xxxix, 1924, pl. 871; Shaw & Shebb, J. Darjeeling N. H. Soc. iv, 1930, p. 56; Shaw, Shebb. & Barker, J. Bengal N. H. Soc. xv, 1940, p. 65.

Maxillary teeth 10 or 11+2; anterior palatine teeth not strongly enlarged; 1, sometimes 2, preoculars, reaching the upper surface of the head; temporals 1+2 or 2+3; posterior genials as long as the anterior, usually in contact with one another. Scales in 21:21:15 rows, vertebrae not strongly enlarged. V. 223-250; C. 100-115.

Hemipenis not known.

Greyish brown above, finely speckled with black, and with narrow, black, transverse or oblique bars; these may meet one another on the vertebral line, forming A-shaped marks, in the apex of which there is a more or less distinct white spot; a black longitudinal stripe on the nape and two more on the top of the head; another from the eye to the angle of the mouth; lower parts whitish, thickly spotted and speckled with black.

Total length: ♀ 880, tail 185 mm.

Range. The Himalayas; Western Himalayas (Subathu, Mussooree, Naini Tal, Muktesar); Eastern Himalayas (Nepal, Darjeeling district).

Found generally above 5,000 feet altitude.

271. *Boiga cynodon*.

Dipsas cynodon Boie, 1827, Isis, p. 549 (Sumatra); Schlegel, Phys. Serp. 1837, ii, p. 268, pl. xi, figs. 10 & 11.—*Dipsadomorphus cynodon*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 78; Wall, J. Bombay N. H. S. xix, 1909-1910, pp. 353, 832, & 899.—*Boiga cynodon*, Wall, ibid. xxix, 1924, p. 874, and xxx, 1925, p. 818.

Maxillary teeth 11 or 12+2; anterior palatine teeth strongly enlarged; 1 preocular, reaching the upper surface of the head; temporals 2+3 or 3+3; 8 or 9 supralabials, 3rd, 4th and 5th, or 4th, 5th and 6th touching the eye; posterior genials larger than the anterior, in contact with one another anteriorly, often abruptly diverging posteriorly and separated by small scales. Scales in 23, rarely 25:23, rarely 25:15 rows, vertebrae strongly, or very strongly, enlarged. V. 250-282, with an obtuse lateral keel; C. 120-157 (for specimens from the Indo-Chinese region).

Hemipenis extending to the 17th caudal plate, the distal $\frac{1}{2}$ is calyculate the cups being large, longer than broad, with scalloped but not spinose edges, the remainder of the organ has smooth longitudinal folds, the two areas are sharply defined from one another.

Brownish greyish or pinkish above, with dark brown or black chevron shaped spots, very distinct anteriorly, but which may become indistinct or disappear entirely, posteriorly, white spots or cross bars sometimes present, best marked on the posterior part of the body a series of large white (pink in life), dark edged rounded or rosette shaped spots on the outer margins of the ventrals and usually including scale rows 1 and 2 nape with two longitudinal, parallel, black stripes another from the eye to the angle of the mouth, yellowish or greyish below, more or less thickly powdered with brown or black. Some individuals are very pale in colour with the dark markings hardly distinguishable.

Total length ♂ 1440, tail 330, ♀ 1680, tail 370 mm.

Larger specimens have been recorded from the Malayan region, they also differ in coloration (Form B of Boulenger, Cat. iii p. 79).

Range Bengal (Jalpaiguri), Assam (Garo and Naga Hills, Samaguting, Cachar, Nahar Khatiya), Burma, as far north as lat 26° (Myitkyina), Siam, Cambodia, the Malay Peninsula and Archipelago.

B. cynodon is a snake of the plains and of the hill country at low altitudes. It is sluggish in its disposition, those that I have kept could be freely handled, even when newly caught. Its main food appears to be birds and their eggs.

272 *Bolga forsteni*.

Triglyphodon forsteni Dum & Bib 1854, Erp. Gen. vii, p. 1077 (type loc. unknown) — *Dipsos forsteni*, Günther, Rept. Brit. Ind. 1864, p. 309, Anderson, P. Z. S. 1871, p. 187, Stoliczka, J. A. S. Bengal, xl, 1871, p. 439, Boulenger, F. B. I. 1899, p. 362 — *Dipsosomorphus forsteni*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 80, Wall, J. Bombay N. H. S. xix, 1909, p. 757, and xxvi, 1919, p. 571, — *Bolga forsteni*, Wall, Sn. Ceylon, 1921, p. 285 and J. Bombay N. H. S. xxix, 1924, p. 874.

Dipsos forsteni var. *crylomenus* Anderson, 1871, P. Z. S. p. 187 (Ceylon).

Triglyphodon tessellatum Dum & Bib 1854, Erp. Gen. vii, p. 1092 ("Java", Paris).

Maxillary teeth 10 to 12+2, anterior palatine teeth strongly enlarged, diameter of the eye not twice its distance from the mouth, 1 preocular, reaching the upper surface of the head, temporals small, 3+3 or 3+4, 8 to 11 supra-labials, 3rd, 4th and 5th, or 4th, 5th and 6th touching the eyes, genitals variable in size, the posterior pair generally

separated from one another by small scales. Scales in 25 or 27:27 or 29:17 rows, vertebrals feebly or strongly enlarged, the enlargement very variable, even in the same individual. V. 254-273, with a distinct lateral keel; C. 102-119.

Hemipenis extending to the 12th caudal plate: as in *cynodon*, but the folds crenate.

Brown or reddish above, uniform, or with more or less regular, angular black spots or cross-bars, with white spots between them; these are most distinct on the anterior part of the body, and posteriorly may be replaced by a chequered pattern; a black stripe on the head from the frontal shield to the nape, and two more on the nape parallel with it; a broad black stripe from the eye to the angle of the mouth: labials with black spots or sutures (in those specimens which have dark markings on the body); belly uniform whitish (in those specimens which are of uniform colour above) or heavily spotted or powdered with brown; the lateral keel usually white.

Total length: ♂ 1800, tail 340; ♀ 1600, tail 340 mm. (2312 mm., Wall.)

Range. Ceylon and Peninsular India; Western Ghats (Matheran to Travancore); Ganges Valley (Orcha, Fyzabad, Gorakhpur, Balrampur, Purnea, Manbhum); Orissa (Berhampore); Bengal (Sijna); Eastern Himalayas (Darjeeling district, *fide* Wall). It inhabits both the plains and the hills.

Wall (1921), writing of its habits, states:—"Visiting the Maharajah of Balrampur some years ago, I found some very fine specimens displayed by his professional snake catchers, who assured me that they lived in pairs, and frequented holes in the *mohwa* trees (*Bassia latifolia*), in which they were quite common. It has been described to me as a fierce snake, and what I saw amply confirmed this. . . . Mr. N. Warde tells me that it is a voracious poultry eater, and also robs pigeon houses. One invaded one of his servants' quarters at night . . . and when he advanced into the room, found the snake swallowing a white fowl, and it continued to swallow with apparent unconcern, in spite of the assembled spectators. A specimen brought to me in Orissa had fed on a large bat. One in captivity ate freely the lizards *Calotes versicolor* and sparrows, and on one occasion a mouse. The Balrampur snake-men told me it lays from 7 to 9 eggs in the hot weather."

273. *Boiga dightoni*.

Dipsas dightoni Boulenger, 1894, J. Bombay N. H. S. viii, p. 528, pl. — (Pirmad; Travancore State; London); Ferguson, *ibid.* x, 1895, p. 73.—*Dipsadomorphus dightoni*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 69; Annandale, J. A. S. Bengal, lxxiii, 1904, p. 210; Wall, J. Bombay N. H. S. xxix, 1924, p. 872.

Maxillary teeth 14+2; anterior palatine teeth strongly

enlarged, 1 preocular, reaching the upper surface of the head, temporals 3+3 Scales in 23:23·15 rows, vertebrae strongly enlarged V 228-241, with a feebly distinct lateral keel, C 95-102

Hemipenis not known

Pale reddish brown above, without dark markings, a series of salmon red blotches along the back. Head pale brown, with minute blackish dots; lower parts yellowish, finely dotted with brown, the outer ends of the ventrals salmon pink (Boulenger)

Only three specimens are known

Total length ♂ 1100, tail 220 mm.

Range Travancore (Pinned)

Genus *TARBOPHIS*.

Tarbophis Fleischmann, 1831, *Das Dalmat Serp* p 17 (type *fallax*); Boulenger, *Cat Sn Brit Mus* iii, 1896, p. 47, Wall, *J Bombay N H S* xxix, 1924, p. 868, Werner, *Arch. Naturg* Berlin, 1924, p. 115

Maxillary teeth 8 to 12, anterior longest, gradually decreasing in size posteriorly, and followed by a pair of enlarged, grooved fangs, situated just behind the level of the posterior margin of the eye, head very distinct from neck; eye rather large with vertical pupil. Body cylindrical or slightly compressed, scales smooth, oblique, with apical pits, in 19 to 23 rows, ventrals rounded; tail moderate; subcaudals paired. Hypapophyses absent on the posterior dorsal vertebrae

Range S.E. Europe, S.W. Asia, Tropical and N.E. Africa

Seven species are known, one enters the Indian region.

274 *Tarbophis rhinopoma*

Dipsos rhinopoma Blandford, 1874, *Ann. Mag. Nat. Hist.* (4) xiv, p. 34 (Karman, S. Persia, London & Calcutta), and *Zool. E. Persia*, 1876 p. 424, pl. xxvii, fig. 2—*Tarbophis rhinopoma*, Boulenger, *J. Bombay N. H. S.* ix, 1895, p. 325, and *Cat. Sn. Brit. Mus.* iii, 1896 p. 50, Ingoldby, *J. Bombay N. H. S.* xxix, 1923, p. 127; Wall, *Ibid.* xxix, 1924, p. 868
Dipsadomorphus fallax Wall, 1914, *J. Bombay N. H. S.* xiii, p. 167 (Kacha Tana, Beluchistan: type lost)

Head much depressed; maxillary teeth 8+2; nostril in a large, partially divided nasal, internasals as broad as long, much narrowed anteriorly, much smaller than the prefrontals; frontal as broad as long; loreal elongate, touching the eye, a preocular above it, in contact with the frontal, 2 postoculars, 9 or 10 supralabials, 3rd, 4th and 5th, or 4th, 5th and 6th touching the eye, temporals small, scale-like, 2+3 or 3+4; posterior genials much smaller than the anterior, separated from one another by small scales Scales

in 23:23 (or 22 or 24):17 rows. V. 266-280; C. 77-84 (99 Wall); A. 1.

Hemipenis extending to the 9th caudal plate, not forked; the anterior $\frac{1}{2}$ is calyculate, the cups being deeply scalloped, and longer than broad; the remainder of the organ is spinose, the spines, except at the tip, being enclosed in a triangular sheath; there are 18 in longitudinal series.

Pale greyish above, with a vertebral series of large, dark brown, squarish spots, much broader than their interspaces, and a series of alternating, smaller, less clearly defined spots on the sides of the body; posteriorly the vertebral spots may



Fig. 113.—Maxilla of *Tarbophis rhinopoma*.

divide into two series; belly dark brown. Head with small dark spots; labials dark-edged; throat white.

Blanford's description of the coloration of the type, a fully grown specimen, when alive, is as follows:—"Pale sandy brown, with numerous, irregular, pale, waved transverse bands, much narrower than their intervening dark spaces, and more distinct near the head than farther back; all the scales more or less minutely puncticulated with black; ventral scales dusky, with sandy mottling. Head sandy above, with minute, irregular, black spots."

Total length: ♂ 990, tail 160 mm.

Range. Sind; Baluchistan (Kacha Thana; Miranshah; Tochi Valley); Persia.

Genus PSAMMOPHIS.

SAND SNAKES.

Macrosoma (not of Hubner, 1818), Leach, 1819, in Bowdich's Miss. Ashantee, App. 4, p. 493 (type *elegans*).

Psammophis Fitzinger, 1826, Neue Class. Rept. pp. 29, 30 (type *sibilans*); Boulenger, F. B. I. 1890, p. 365, and Cat. Sn. Brit. Mus. iii, 1896, p. 152, and P. Z. S. 1895, p. 538; Werner, Arch. Nat. Ges. Berlin, A. 12, 1924, p. 138.

Taphrometopon Brandt, 1838, Bull. Acad. Sci. St. Petersb. iii, p. 243 (type *lineolatus*).

Amphiophis Bocage, 1872, J. Sc. Lisboa, iv, p. 81 (type *angolemis*).

Mike Werner, 1924, Sitz. Ber. Akad. Wiss. Wien, Bd. 133, p. 51 (type *elegantissimus*=*condanarus*); Smith, Ann. Mag. Nat. Hist. (10) 1, 1928, p. 495.

Maxillary teeth 10 to 13, one or two in the middle more or less enlarged, fang-like, preceded and (or) followed by an

interspace, the last two much enlarged, grooved and directed strongly backwards, situated below the posterior border of the eye anterior mandibular teeth strongly enlarged. Head distinct from neck with angular canthus rostralis, eye moderate or large with round pupil; body cylindrical; scales smooth more or less oblique, in 17 rows for all species in the Oriental region ventrals rounded, tail long, subcaudals paired Hypapophyses absent on the posterior dorsal vertebrae

Common characters, unless otherwise stated — Eye large, its diameter much greater than its distance from the mouth, nostril between two nasals rostral broader than high, visible from above loreal region concave loreal shield elongate, twice as long as high, 1 pre and 2 postoculars, genials subequal or the anterior pair longer, in contact with one another Scales in 17 17 15 or 13 rows

The distinction between *Psammophis* and *Taphromelopus* rests upon the character of the maxillary teeth, through *P. leithi* the two are connected

As already observed by Boulenger (Cat. iii, p 152), the skull of *Psammophis* is remarkable for the wide vacuity between



Fig 114 — Maxilla of *Psammophis lineolatus*

the parietal, frontal and sphenoid bones, a condition which approaches that of the Lacertilia; in front the frontal descends to join the sphenoid A similar vacuity occurs in *Haplopetura*

The hemipenis is long and extremely slender, so slender that I have been unable to make a proper examination of it from the material at my disposal It has neither spines nor calyces but is provided with longitudinal folds It does not differ in the five species dealt with in this work Writing of *condanarus*, Wall (1911, p 629) states, "The male claspers I found peculiar, differing from these organs in other snakes in that when forcibly extruded by digital pressure behind the vent, they were directed downwards instead of forwards They are thin, long and spirally twisted, reminding me of a buck's horn They are entirely lacking in asperities or tentacles such as one usually sees on these organs in other snakes The secretion from the anal glands in both sexes is greenish yellow"

Psammophis tenuata Günther, Ann Mag Nat Hist (3) ix, 1862, p 293, is not sufficiently characterized to be identifiable, and there are no specimens in the British Museum bearing that label It was said to have come from India

Key to the Species.

I. Anal divided.

A. Frontal distinctly longer than its distance from the end of the snout.

a. Anterior end of frontal twice as broad as the middle; nasal completely divided.

Median maxillary teeth strongly enlarged *schokari*, p. 363.Median maxillary teeth feebly enlarged *lineolatus*, p. 367.

b. Anterior end of frontal not twice as broad as the middle; nasal incompletely divided

condanarus, p. 364.

B. Frontal not longer than its distance from the end of the snout; preocular not in contact with the frontal

longifrons, p. 365.

II. Anal undivided.

Preocular in contact with frontal; 1 anterior temporal

leithi, p. 366.275. *Psammophis schokari* *.

Coluber schokari Forskal, 1775, Descr. Anim. p. 14 (Yemen, S. Arabia).—*Psammophis schokari*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 157; Wall, J. Bombay N. H. S. xx, 1911, p. 1038 (in part), and xxix, 1924, p. 875; Ingoldby, ibid. xxix, 1923, p. 129.

Psammophis sindanus Stoliczka, 1872, Pr. A. S. Bengal, p. 83 (Katch and Sind).

The above synonymy refers only to specimens from the Indian Region.

Maxillary teeth 13 or 14, two in the middle very strongly enlarged and preceded and followed by a distinct interval. Internasals $\frac{1}{2}$ — $\frac{3}{4}$ the length of the prefrontals; frontal long and narrow, much longer than its distance from the end of the snout, suddenly enlarging anteriorly where it is twice as broad as in the middle, in contact with the preocular; temporals 2+2; 8 or 9 supralabials, 4th and 5th, or 5th and 6th, touching the eye. V. 164–187; C. 121–134; A. 2 (for specimens from India and the adjacent territory).

Colour very variable: Yellowish, buff or greyish above, with four dark brown longitudinal stripes; the median pair on either side of the vertebral line, the lateral pair on scales rows 1–3; they are bordered on each side with black, or with a series of elongated black spots; head with dark brown symmetrical markings; a dark stripe along the side of the head through the eye; yellowish below with a black line along the outer side of the ventrals, and with or without a median speckling or a series of paired spots.

The variations occur through loss of colour-pattern, the dark brown stripes disappearing to leave only the black spots

* Loveridge, in a paper on the African species of *Psammophis* (Bull. Mus. Comp. Zool. Harvard, lxxxvii, 1940) regards *schokari* as a race of *sibilans*.

wh ch edge them or these may also be lost the snake then being of a uniform grey colour above yellowish below

Total length ♂ 1280 tail 460 mm

Range Rajputana (Jodhpur) Punjab (Labore) Kashmir (Chilas) N W F Provinces (Waziristan Tochi Valley) Baluchistan Sind and westwards through Persia and Arabia to North Africa

278 *Psammophis condanarus*

Coluber condanarus Mocquard, 1829 Tent Syst. Amph p 107 (based on Russell 1, p 32 pl 27 Ganjam dist.) — *Psammophis condanarus* Boulenger F B L 1890 p 365 and Cat. Sn. Brit Mus v 1896 p 165; Günther Rept Brit. Ind. 1864, p. 291 Stolcika, J A. S. Bengal, xxxix, 1870 p 196 Theobald, Rept Brit Ind 1876 p 187 Wall, J Bombay N. H. S. xviii, 1907 p 1*1 and xx, 1911 p 6*6 col. pl., and xxix, 19*4 p 876 Sm h, J Nat Hist Soc Siam, i 1914 p 17 photo *Leptophis bell* Jerdon, 1853 J A. S. Bengal, xxi, p 529 Günther Rept Brit Ind. 1864 p 291 (Jalna, Hyderabad) *Psammophis* and *cus* Beddome, 1863 Madras Quart J Med. Sc. vi, p 45 (Kurnool Dist) and J Soc B bi Nat. Hist. i 1940 p 310 [reprint]

Maxillary teeth 12 or 13 2 in the middle enlarged with a distinct interval in front but not always behind upper head shields not protuberant nasal incompletely divided a suture only from the nostril to the labial internasals $\frac{1}{2}$ as long as the prefrontals or not quite so much frontal long and narrow much longer than its distance from the end of the snout the anterior end not suddenly enlarged not greatly broader there than in the middle not in contact with the preocular temporals 1+2 8 supralabials 4th and 5th touching the eyes anal divided

Pale olive or buff above with 4 or 5 dark brown longitudinal stripes, more or less conspicuously edged with black head brown with more or less distinct longitudinal markings the continuation forwards of the stripes upon the body lower parts yellow or yellowish white with a black line along each side at the outer margin of the ventral shields

Total length ♀ 1075 tail 250 Males are smaller

Two races can be defined —

I *Psammophis condanarus condanarus*

This form has usually 5 dark stripes a vertebral a dorso-lateral pair and a lateral pair the vertebral may be absent the dorso-lateral pair is upon scale-rows 5 6 and 7 A juvenile in the Bombay collection from Berar is brown above with a broad black vertebral stripe occupying 5 scale-rows. V 165-179 C ♂ 85-93 ♀ 75-85

Range Cutch Sind Punjab Central India (Poona Jalna Kurnool Berar) UP Bihar and Orissa Bengal as far east as long 86°

II. *Psammophis condanarus indochinensis*, ssp. nov.

The Indo-Chinese form has 4 stripes only; the vertebral is never present, and the position of the dorso-lateral stripe is upon scale-rows 6, 7 and 8. This form also is subject to greater variation in coloration than the Indian one. The median pair of stripes may be united to form a single broad one; or the stripes may be almost absent, the snakes then being almost uniform brown in coloration above. V. 156-173; C. ♂ 75-85; ♀ 66-75.

Range. Indo-China south of lat. 21° (Taungyi, Pegu, Lopburi, Bangkok, Phan-rang in Annam).

It will be noted that the range of the two forms is not conterminous, there being a large area of country through eastern Bengal, Assam and Upper Burma where no specimens have yet been obtained.

Wall states that it is a common snake in the United Provinces, and in the Western Himalayas at between 3,000-6,000 feet altitude. It appears to be not uncommon in the Pegu district; and there used to be a small colony of them on the outskirts of Bangkok.

In disposition it is shy; it is extremely active in its movements, and is fond of ascending low bushes. Its food consists of small rodents, lizards and frogs. Those that I kept in captivity refused all food.

277. *Psammophis longifrons*.

Psammophis longifrons Boulenger, 1896. Cat. Sn. Brit. Mus. iii, p. 165 († Cuddapah Hills, Madras Pres.; London); Dreckmann, J. Bombay N. H. S. vii, 1892, p. 406; Gleadow, *ibid.* viii, 1894, p. 553; D'Abreu, *ibid.* xxii, 1913, p. 634; Wall, *ibid.* xxix, 1924, p. 875.

Maxillary teeth 12 or 13, 2 in the middle very strongly enlarged, and preceded and followed by a distinct interval; internasals small, $\frac{1}{2}$ or less than $\frac{1}{2}$ the length of the prefrontals; frontal long and narrow, not longer than its distance from the end of the snout, the anterior end not suddenly enlarged, not greatly broader there than in the middle, not in contact with the preocular; temporals 2+2; 8 supralabials, 4th and 5th touching the eye. V. 166-175; C. 79-93; A. 2.

Greyish above in front, browner behind, the scales edged with black, particularly those of the vertebral region; top of head uniform greyish brown, or the scales edged with black; greyish or yellowish white below.

Total length 1230, tail 375 mm. (*vide* Dreckmann).

Of considerably stouter build than the other Indian members of this genus.

Range. Bombay Presidency north of lat. 19° (Thana and Damanganga districts, Bulsar, Panch Mahals); C.P. (Nagpur).

known only from a few specimens. The type locality, Cadapah Hills is probably incorrect.

D'Abreu records finding six Scinks in the stomach of his specimen.

Its habits are both terrestrial and arboreal.

278 *Psammophis leithi*.

Psammophis leithi Günther, 1869, P. Z. S. p. 505 pl. 39 (Sind, London). Stoliczka, P. A. S. Bengal 1872, p. 83; Boulenger, F. B. I. 1890 p. 365 (in part) and Cat. Sn. Brit. Mus. iii, 1896 p. 155. Wall, J. Bombay N. H. S. xviii, 1907, pp. 120 & 203 and xv 1911 p. 1039, and xxix, 1924 p. 875, Ingoldby, ibid. xxix 1923 p. 129.

Maxillary teeth 11 or 12, the median ones feebly enlarged, an edentulous space before or after, sometimes both. Posterior

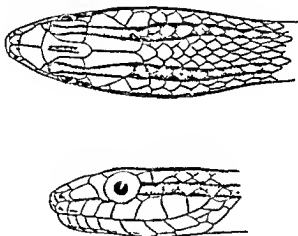


Fig. 115.—*Psammophis leithi* (B.M. 91915)

nasal sometimes divided by a longitudinal suture, inter nasals $\frac{1}{2}$ to $\frac{3}{4}$ as long as the prefrontals, frontal long and narrow, much longer than its distance from the end of the snout, suddenly enlarged anteriorly, where it is nearly twice as broad as in the middle, in contact with the preocular, temporals 1+2, 8 supralabials, 4th and 5th touching the eye, 5 infralabials in contact with the anterior genials. V ♂ 159-175, ♀ 170-185; C ♂ & ♀ 92-100, A 1.

Light yellowish brown above, with four dark brown longitudinal stripes, the median pair, on either side of the vertebral

line, conspicuous and bordered on each side with black spots, which may be continuous with one another; on the head they extend forward as far as the eyes; the outer pair, on scale-rows 1 and 2, are less conspicuous and often absent; they extend forwards on each side of the head to the nostrils; usually a dark median longitudinal stripe on the top of the head; yellowish white below, uniform.

Total length : ♀ 765, tail 235 mm.

Range. Baluchistan (Munro Khalat); Sind; Cutch; Western India; Bombay Presidency (Poona); Rajputana; U.P. (Fyzabad); Punjab; N.W. Frontier Province (Thal, Kaur Bridge); Kashmir (Chilas).

279. *Psammophis lineolatus*.

Coluber (Taphrometopon) lineolatus Brandt, 1836, Bull. Acad. Sci. St. Petersb. iii, p. 243 (Transcaspia).—*Taphrometopon lineolatum*, Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 151; Alcock & Finn, J. A. S. Bengal, lxxv, 1896, p. 563; Annandale, *ibid.* lxxiii, 1904, p. 210; Nikolsky, Faune de la Russie, 1916, p. 193; Tsarowsky, Ann. Mus. Zool. Leningrad, xxii, 1917, p. 89; Wall, J. Bombay N. H. S. xxix, 1924, p. 875; Pope, Rept. China, 1935, p. 321, pl. xiv.

Psammophis triticeus Wall, 1912, J. Bombay N. H. S. xxi, p. 634 (Baluchistan).

Maxillary teeth 13 or 14, the median ones feebly enlarged, an edentulous space in front, but not behind. Supraocular shield and canthus rostralis protuberant; internasals $\frac{2}{3}$ as long as the prefrontals; frontal long and narrow, much longer than its distance from the end of the snout, suddenly enlarged anteriorly, where it is nearly twice as broad as in the middle, in contact with the preocular; temporals 2+2; 9 supralabials, 4th to 6th touching the eye. V. 174-186; C. 72-90; A. 2 (for specimens from Baluchistan and Afghanistan).

Light yellowish brown above, with four dark brown longitudinal stripes; the median pair, on scale-rows 5 to 7, conspicuous, and spotted or bordered with black; on the head they extend forward to the eyes; the outer pair, on scale-rows 1 to 3, usually less conspicuous; on the head they extend forward to the nostrils; upper part of head with dark longitudinal markings; below yellowish white, with or without a median stippling, and a linear spot at the outer side of each ventral; chin with dark longitudinal markings.

Total length : 870, tail 190 mm.

Range. Baluchistan (Quetta, Marachak, Chaman, Baleli) and westward through Persia, Afghanistan and Turkestan to the Aral-Caspian region, thence through Mongolia to N.W. China.

Genus PSAMMODYNASTES.

Psammodynastes Günther, 1858, Cat Col Sn. Brit Mus p 140 (type *Psammophis pulverulentus* Boie): Boulenger, F B I 1890 p 363 and Cat Sn. Brit Mus in, 1896, p 172
Anasodon Rosen, 1905, Ann. Mag Nat Hist (7) xv, p 176 (type *lilljeborgi*)

Maxillary teeth 10 to 12, 2 or 3 small anterior teeth, followed by 2 much enlarged, fang like ones, then after a small interval 5 small teeth followed by 2 very large grooved fangs, head distinct from neck, with angular canthus rostralis and concave lores, eye rather large, with vertically elliptic pupil, body cylindrical, scales smooth, without pits, in 17 17 15 rows ventrals rounded, tail moderate, subcaudals paired Hypapophyses present on the posterior dorsal vertebrae

Two species are known, one inhabiting Indo China and the Malayan region, the other, *P. pictus*, Borneo and Sumatra



Fig. 116 — A Maxilla and B Palato maxillary arch of *Psammodynastes pulverulentus*

280 *Psammodynastes pulverulentus*.

MOCK VIPER

Psammophis pulverulentus Boie, 1827, Isis p 547 (Java) — *Psammodynastes pulverulentus*, Boulenger, F B I 1890, p 363, and Cat Sn Brit Mus in 1896, p 172, Wall. J Bombay N H S xvii, 1907, pp 204 and 330, and xx, 1910, p 72, col. pl., and xii, 1912 p 686 and xxix, 1924, p 875, and xxx, 1925, p 818, Pope, Rept China, 1935, p 324, Bourret, Serp Indochine 1936, p 326, Smith, Rec. Ind. Mus xli, 1940, p 484, Shaw & others, J Bengal N H S xvi, 1941, p 57.

Dipsos ferrugineus Cantor, 1839 P Z S p 53 (Assam, sketch in Bodleian Library)

Lycodon boardi Steindachner, 1867, Reiso Novara, Rept. p 90 (Philippines Vienna)

Anasodon lilljeborgi Rosen, 1905, Ann. Mag Nat Hist (7) xv, p 176 (Java Lund)

Snout short, truncate in profile, slightly turned up in the

adult; nostril in a single nasal; rostral a little broader than high; internasals much smaller than the prefrontals; frontal narrow, elongate, more or less bell-shaped, longer than its distance from the end of the snout; loreal about as long as high, sometimes transversely divided; 1 or 2 pre-

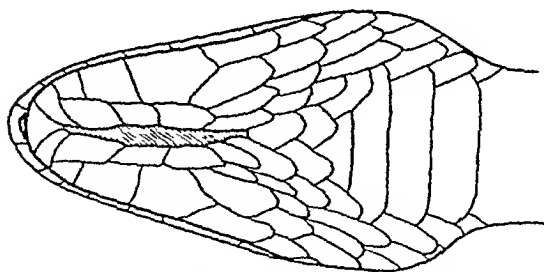
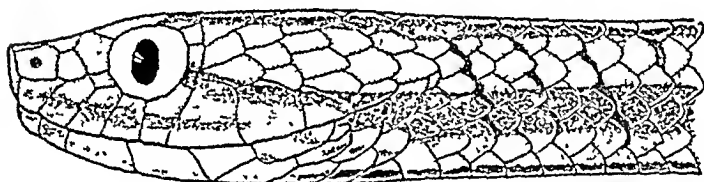
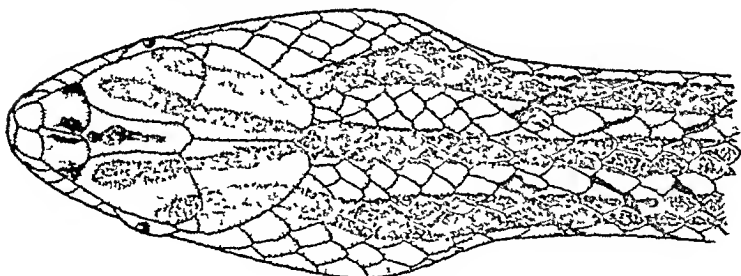


Fig. 117.—*Psammodynastes pulverulentus*.

oculars, the upper forming part of the canthus rostralis, widely separated from the frontal; 2 to 4 postoculars; temporals 2+3, rarely 2+2; usually 8 supralabials, 3rd, 4th and 5th touching the eye; 4th infralabial, very large; 3 pairs of genials, the anterior pair broadest. V. 146-175; C. 44-71; A. 1.

Hemipenis extending to the 10th caudal plate forked opposite the 6th it is entirely spinose the spines being nearly uniform in size with the exception of two large thick basal ones on either side of the sulcus, proximal to the point of forking the spines show no definite arrangement, but opposite and distal to that point they are set in oblique rows that join on a line opposite the sulcus the spines of each row are joined basally by soft tissue, the sulcus is divided some distance proximal to the point of forking and has fairly prominent, smooth lips which are almost entirely devoid of spines throughout (Pope)

Colour very variable light or dark brown or blackish, reddish, greyish or yellowish above with small black spots or streaks sometimes arranged in pairs, sometimes a series of pink or orange spots on either side of the vertebral line flanks usually with three closely-set longitudinal lines or with yellow spots lower parts thickly powdered with brown or grey and with dark spots or longitudinal lines head with dark symmetrical markings.

Total length ♀ 510 tail 90 mm (600 mm. Wall.)

Range The whole of the Indo-Chinese subregion from the Eastern Himalayas as far west as Nepal, to Southern China Hama, and south to the Malay Archipelago

Found in the plains and in the hills. Fairly common in many places in wooded country particularly in hilly districts

A plucky and vicious little snake striking fiercely at anyone who attempts to handle it Frogs and lizards form its main diet The young are born alive from 3 to 10 being produced at a time Shaw (1941) saw one strike a *Natrix subrepta* which died in 16 minutes

Genus DRYOPHIS

WHIP SNAKES

Dryinus (not of Latreille, 1804) Merrem, 1820, Syst. Amphib. p. 136

Dryophis Dalmann, 1823, Analect. Entomol. p. 7 (subst. name for

Dryinus type Col. *nanus* Merrem, by Mon. 1827 p. 519):

Boulenger P. B. I. 1890 p. 357 and Cat. Sn. Bri Mus. iii.

1896 p. 177 Wall, J. Bombay N. H. S. xxix, 1924, p. 876

Paserio Gray 1825 Ann. Phil. (n.s.) x, p. 208 (subst. name for

Dryinus type *myricaria*)

Trogope Wagler 1830, Nat. Syst. Amphib. p. 184 (type *proanus*)

Günther Rept. Brit. Ind. 1864, p. 302.

Herpetotrogon Fitzinger 1843 Syst. Rept. p. 27 (type *nanus*)

Dystyche Gistel, 1843, Naturg. Thier. ii (subst. for *Trogope*)

Wagler)

Tropidocoryx Günther 1860, Ann. Mag. Nat. Hist. 6 (3) p. 423

(type *perroti*)

Gephyronus Cope, 1886 Proc. Amer. Phil. Soc. xiii, p. 422 (type

franciscus)

Ahetulla, Méné & Henning Zool. Anz. Leipzig xcix, 11/12, 1932,

p. 296 Stejneger Copeia, 1933 p. 203

Maxillary teeth 12 to 15 the anterior 6 or 7 gradually

enlarged from before backwards or the last two suddenly enlarged, followed by an interspace, after which the teeth are small; 1 or 2 posterior grooved fangs, situated below the posterior border of the eye; ectopterygoid more or less distinctly forked anteriorly (fig. 118) the two branches articulating with the maxilla; head elongate, distinct from neck, with strong canthus rostralis and concave lores; eye large, transversely oval, with horizontal pupil; nostril in the posterior part of an elongated nasal; frontal narrow, elongate, more or less bell-shaped. Body very elongate and compressed; scales smooth, in 15:15:13 rows, disposed obliquely, the vertebral row slightly enlarged; ventrals rounded or with an obtuse lateral keel; tail long; subcaudals paired. Hypapophyses absent on the posterior dorsal vertebrae.

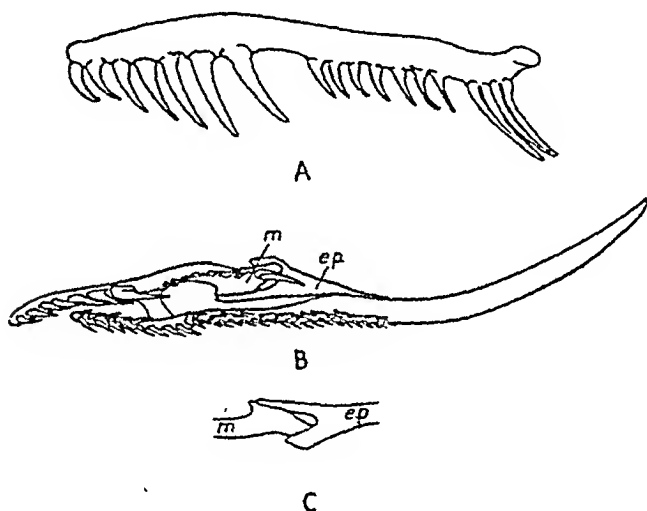


Fig. 118.—A. Maxilla. B. Palato-maxillary arch. C. Articulation of maxilla (m.) and ectopterygoid, (ep.) of *Dryophis nasutus*.

The following account of the hemipenis will serve for all the species. The organ is short and is not forked; the distal end is calyculate, the cups having scalloped edges; this area merges gradually into a spinose one, at the end of which there are a few enormous spines; proximal to the spines, there are longitudinal folds.

Range. The Oriental Region; Celebes and the Philippines. Of the 8 species known, 7 are included in this work.

A genus of Tree-Snakes, living chiefly on bushes and shrubs, through which they can move with ease and great rapidity; in search of food, they often descend to the ground. As far as is known, all of them produce living young.

The absence of a strongly marked lateral ventral keel in a genus which is essentially arboreal in its habits, is unusual. It is noteworthy also that in many of the species, although

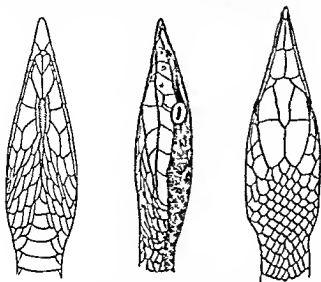


Fig 119—*Dryophis nanutus*

no keel or almost no keel is evident, its position is indicated by a white line

Key to the Species

- I Snout without dermal appendage, projecting feebly beyond the lower jaw
- A. Snout not twice as long as the eye, prefrontals not twice as long as broad.
No loreal, 1 postocular, C. 65-86 *perroteti*, p. 373
1 or 2 loreals, 2 postoculars; 1 or 2 preoculars, C. 84-119 *dispar*, p. 373
- B Snout at least twice as long as the eye; prefrontals at least twice as long as broad.
Nasals usually in contact with one another above the rostral, 3rd and 4th labials horizontally divided, C 115-148 *fronticanctus*, p. 374.
Supralabials entire; V. 194-235, C 151-187; A. 2 *prasinus*, p. 375
Supralabials entire; V 186-195, C 136-156, A. 1 *mycterizans*, p. 376.
- II. Snout ending in a pointed, dermal appendage, usually extending far beyond the lower jaw
- Dermal appendage formed usually only of the rostral, colour green *nanutus* p. 376
Dermal appendage covered with small scales; grey or brown with black spots *pulchellus*, p. 374.

281. *Dryophis perroteti*.

Psammophis perroteti Dum. & Bib. 1854, *Erp. Gen.* vii, p. 899 ('Indes Orientales'; Paris).—*Dryophis perroteti*, Boulenger, F. B. I. 1890, p. 868, and Cat. Sn. Brit. Mus. 1896, iii, p. 178; Wall, J. Bombay N. H. S. xvii, 1906, p. 7, fig., and xxvi, 1919, p. 571, and xxix, 1924, p. 876.
Leptophis ? canarensis ? Jerdon, 1853, J. A. S. Bengal, xxii, p. 530 (North Canara).

Snout obtusely acuminate, without dorsal appendage, not twice as long as the eye; no loreal, the internasals and prefrontals touching the labials; 1 preocular, in contact with the frontal; 1 postocular; temporals 1+2 or 2+2; 8, rarely 9, supralabials, 4th and 5th touching the eye, 4th sometimes horizontally divided; anterior pair of genials as long as the posterior. Scales on the sacral region keeled, strongly in the male, feebly in the female. V. 136-146; C. ♂ 65-75; ♀ 71-86; A. 2.

Bright green above, the interstitial skin black and white forming oblique lines, sometimes all black; yellowish white or pale greenish below; a white line along the outer edge of the ventrals, edged inside with green; top of head often bronze, lips paler. A specimen from the Nilgiris is olive-brown above.

Total length: ♀ 545, tail 135 mm. (590, Wall.)

Range. The Western Ghats (Nilgiri Hills, North Canara). Common in the Nilgiris at about 5,000 feet altitude.

Wall (1919) records 9 gravid females taken in the Nilgiris between July and the beginning of September. Their eggs numbered from 2 to 10, and the embryo in some was partly developed.

282. *Dryophis dispar*.

Tragops dispar Günther, 1864, *Rept. Brit. Ind.* p. 303, pl. 23, fig. A (Anamalai Hills; London).—*Dryophis dispar*, Boulenger, F. B. I. 1890, p. 368, and Cat. Sn. Brit. Mus. iii, 1896, p. 179; Fisher, J. Bombay N. H. S. xxiv, 1915, p. 194; Wall, *ibid.* xvii, 1906, p. 7, fig., and xxix, 1924, p. 877.

Snout acuminate, without dermal appendage, not twice as long as the eye; internasals, and sometimes the prefrontals, touching the labials; 1 or 2 small loreals, rarely absent altogether; 1 preocular, in contact with the frontal; 2 postoculars; 8 supralabials, 4th divided, forming 1 or 2 presuboculars, 5th touching the eye; temporals 2+2 or 2+3; anterior genials as long as, or a little shorter, than the posterior. Scales on the sacral region smooth, or feebly keeled. V. 136-156; C. 84-119; A. 2.

Bright green or bronzy olive above, the interstitial skin black and white forming oblique lines, sometimes all black;

pale green or olive below, a white or yellow line along the outer margin of the ventrals

Total length ♀ 725, tail 240 mm

Range The Western Ghats (Nilgiri Hills to Travancore)
Fisher's specimen was secured in the Anaimalai Hills at 8,000 feet altitude. It contained four fully formed young

283 *Dryophis fronteleinctus*.

Dryophis fronteleinctus Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 158 (type loc. unknown London); Boulenger, F. B. I. 1890, p. 368, and Cat. Sn. Brit. Mus. II, 1896, p. 179; Wall & Evans, J. Bombay N. H. S. xii, 1900, p. 346; Wall, ibid. xvi, 1906, p. 7, fig. and xix, 1909, p. 353, figs. and pl., and xxix, 1924, p. 876; Shaw and others, J. Bengal N. H. S. xvi, 1941, p. 61—*Tragopsis fronteleinctus*, Günther, Rept. Brit. Ind. 1864, p. 304, fig. E (East Indies); Stoliczka, J. A. S. Bengal xxxix, 1870, p. 197; Theobald, Cat. Rept. Brit. Ind. 1876, p. 192.

Snout acuminate, without dermal appendage, 2 to 2½ times as long as the eye, nasals usually in contact with one another in front of the internasals, nasals and prefrontals separated from the labials by two loreals, 1 preocular, touching or just separated from the prefrontal, 2 postoculars, rarely only 1, temporals 2+2 or 3+3, normally 7 supralabials, 1st and 2nd entire, 3rd and 4th subject to both horizontal and vertical division, 5th below the eye; anterior genials much shorter than the posterior, or the latter divided, forming three pairs in all. Scales of the sacral region keeled, more strongly in the male than in the female. V 168-196, C ♂ 139-148; ♀ 115-136, A 2.

Bright green, olive or bronze brown above, the interstitial skin black and white forming oblique lines, pale green or olive below, a white streak along the outer edge of the ventrals often margined inside with black, top of head with or without black dots.

Total length ♀ 980, tail 310 mm

Range Lower Burma (Watiya, Rangoon and Pegu districts)
Wall records a specimen from Assam (Sibsagar) and another from Darjeeling.

"Abundant on the bushes which fringe the banks of many of the tidal rivers of Lower Burma; when attacked, they invariably take refuge in the water" (Stoliczka).

Wall (1924) comments on its curious distribution as follows: "It is significant that the Burmese species which Stoliczka (1870) reports a true brackish water species common about the mouth of the Moulmein River, and Theobald (1876) reports by no means scarce in the mangrove swamps on the Arakan coast, should not have been recorded anywhere in Burma except at the mouths of rivers, and should again be found far inland in Assam, and in the Darjeeling District."

284. *Dryophis prasinus*.

Coluber nasutus (not of Lacépède) Russell, 1801, Ind. Serp. ii, p. 28, pl. 24 (Java) *.

Dryophis prasinus Boie, 1827, Isis, p. 545 (Java); Boulenger, F. B. I. 1890, p. 369, and Cat. Sn. Brit. Mus. iii, 1896, p. 180; Wall, J. Bombay N. H. S. xvii, 1906, p. 7, fig. head, and xix, 1909-1910, pp. 353 and 834, and xxix, 1924, p. 877; Smith, J. Nat. Hist. Soc. Siam, iv, 1920, p. 97, and Rec. Ind. Mus. xlii, 1940, p. 484; Bourret, Serp. Indochine, 1936, p. 330, and Bull. Instr. Pub. Hanoi. 1939, p. 28; Shaw and others, J. Bengal N. H. S. xvi, 1941, p. 62.—*Ahaetulla prasina*, Stejneger, Copeia, 1933, p. 203; Pope, Rept. China, 1935, p. 322, pl. xiii.

Dryophis prasinus flavescens Smith, 1915, J. Bombay N. H. S. xxiii, p. 785 (Trang Pen. Siam).

Dryophis prasinus indicus and *chinensis* Mell, Sitz. Ber. Ges. Nat. Fr. Berlin, 1930, p. 323.

Snout acuminate, without dermal appendage, 2 to 2½ times as long as the eye; nasals in contact with the labials; prefrontals separated from them by 2 or 3 loreals; 1 preocular, in contact with the frontal; 2 postoculars; temporals usually 2+2 or 2+3; 9 supralabials, all entire, 4th, 5th and 6th touching the eye; anterior genials much shorter than the posterior. Scales of the sacral region strongly keeled in the male, the keel often broken into tubercles and pigmented with black. V. 194-235; C. ♂ 165-187; ♀ 151-172; A. 2, rarely 1 (for specimens from the Indo-Chinese region).

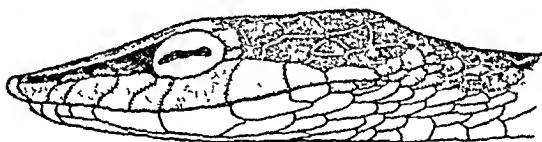


Fig. 120.—*Dryophis prasinus*. (B.M. 97 6.21.59.)

Green, grey, yellow, buff or cream above, the interstitial skin black and white, forming oblique lines; paler below; a white or yellow line along the outer margin of the ventrals, usually absent in specimens of pale coloration.

Total length: ♂ 1580, tail 525; ♀ 1970, tail 670 mm. (both from Pulo Condore, South China Sea). Specimens from the mainland of Asia are somewhat smaller.

Range. From Bengal (Jalpaiguri district) and the Eastern Himalayas (Sikkim) throughout the whole of the Indo-Chinese region as far north as the Triangle in Upper Burma, to the Malay Peninsula and the Indo-Australian Archipelago; Pulo Condore off the coast of Cochin China.

* Russell, on p. 28, quotes Shaw, despite the fact that Shaw's work is dated 1802.

Common throughout the Indo Chinese region, both in the hills at low altitudes and in the plains. Although I obtained it from nearly all parts of Siam, I never saw a specimen from Bangkok, where it was replaced by *nasutus*.

A very gentle snake, quite unafraid, and easily handled. Like *nasutus* it has the habit of putting its tongue out and keeping it out, almost motionless, for a considerable time.

I obtained a female in S.E. Siam on July 1st containing 6 young almost ready for expulsion. Their average length was 240 mm.

285 *Dryophis myeterizans*.

Coluber myeterizans Linn. 1758, Syst. Nat., ed. 10, p. 226 (America), Anderson, Bih. Sven. Vet. Akad. Stockholm, xxiv 1898, 4, 6, p. 14.

Dryophis xanthosoma Boie, 1827, liss., p. 545 (Java); Boulenger, Cat. Sn. Brit. Mus. vii, 1896, p. 180, and Rept. Malay Pen. 1912, p. 175. — *Paseerata xanthosoma*, Smith, Bull. Raffles Mus. No. 3, 1930, p. 66.

Like *gracilis* but with the anal entire, fewer ventrals, 186-195, and fewer subcaudals, 132-156.

Green or greyish above, the interstitial skin black and white, whitish below, a white line along the outer margin of the ventrals, heavily edged inside with green or grey, sometimes also a median ventral line of the same colour, throat white.

Total length ♀ 1080, tail 410 mm. I have not seen a male.

Range. A Malayan species that just enters the Indo Chinese region. Robinson and Kloss obtained a specimen at Trang (Isthmus of Kra).

For the change in name see *D. nasutus*.

286 *Dryophis nasutus*.

COMMON GREEN WHIP SNAKE

Coluber nasutus Lacépède, 1759, Hist. Nat. Serp. i, p. 100, and ii, p. 277 pl. 4, fig. 2 (Ceylon, Guinea, Carolina). — *Dryophis nasutus* Anderson, Bih. Sven. Vet. Akad. Stockholm, xxiv, 1898, 4, 6, p. 15. — *Paseerata nasuta*, Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930, 11, p. 32. — *Ahaetulla nasuta*, Stejneger, Copeia, 1933, p. 203.

Coluber myeterizans (not of Linn.), Russell, 1796, Ind. Serp. i, pp. 16, 18; pls. 12, 13 (Vizagapatam). — *Dryophis myeterizans*, Boulenger, F. B. I. 1890, p. 370, fig., and Cat. Sn. Brit. Mus. vii, 1896, p. 182. — Finn, J. A. S. Bengal lxxvii, 1898, p. 66; Alcock & Rogers, Proc. Roy. Soc. London, lxx, 1902, p. 446; Kinnoor, J. Bombay N. H. S. xxxi, 1912, p. 1336; Wall, ibid. xvi, 1905, pp. 308 and 542 col. pl., and xxvi, 1909, p. 572, and Sn. Ceylon, 1921, p. 291; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 174; Prater, J. Bombay N. H. S. xxx, 1924, p. 172; Bourret, Serp. Indochine, 1936, p. 333; Cams, J. Bombay N. H. S. xxvi, 1919, p. 862; McCann, ibid. xxxii, 1928, p. 612, and xxxvii, 1934, p. 226; Fraser, ibid. xxxix, 1937, p. 494; Shaw and others, J. Bengal N. H. S., xvi, 1941, p. 63.

- Dryinus oxyrhynchus* Bell, 1825, Zool. J. ii, p. 326 (India).
Dryinus russellianus Bell, l. c. s. p. 327 (based on Russell's pl. xiii).
Dryophis mycterizans anomalus Annandale, 1906, Mem. A. S. Bengal, i, p. 196 (Ramanad, S. India).
Dryophis mycterizans tephrogaster Wall, 1908, J. Bombay N. H. S. xviii, p. 783, and *tephrogaster*, ibid. xx, 1909, p. 229 (Burma).—*D. m. cinereoventer* in vol. xviii, p. 919, is a slip for *tephrogaster*, see vol. xix, p. 269.
Dryophis mycterizans rhodogaster Wall, 1908, J. Bombay N. H. S. xviii, p. 919 (Schwebo, Upper Burma).
Dryophis mycterizans lepidorostralis Wall, 1910, J. Bombay N. H. S. xx, p. 229 (Bengal)=*D. m. anomalus*, Wall, J. Bombay N. H. S. xx, 1910, p. 524.
Dryophis mycterizans isabellinus Wall, 1910, J. Bombay N. H. S. xx, p. 230 (Paralai near Valpari, Annamalai Hills).
Dryophis mycterizans rhodonotus Wall, 1921, Sn. Ceylon, p. 293 (Galatura Estate, Ceylon).

Snout acuminate, terminating in a pointed dermal appendage, variable in length, shorter than the eye; it has a median groove above, and is formed usually entirely by the rostral, rarely with small scales at the base; length of the snout without the dermal appendage $2\frac{1}{2}$ to 3 times that of the eye; no loreal, the internasals and prefrontals in contact with the labials; 1 large preocular, in contact with the frontal; 2 postoculars; temporals 1+2 or 2+2; normally 8 supralabials, 3rd and 4th, or one only, divided to form 1 or 2 presuboculars, 5th touching the eye, anterior pair of genials shorter than the posterior. V. 166–207; C. ♂ 156–180, ♀ 135–152; A. 2.

Verdant green above, the interstitial skin black and white, forming oblique lines, best marked on the anterior half of the body; pale green below; a white or yellow line along the outer margin of the ventrals; lips sometimes yellowish; throat white, sometimes bluish in life.

This form of coloration is by far the most common, but there are many departures from it. Occasional individuals are yellowish, brown or buff above (*isabellinus*); the belly may be leaden-grey in colour (*tephrogaster*) or rose coloured (*rhodogaster*), or the whole snake may be coloured with shades of pink (*rhodonotus*).

Total length: ♂ 1325, tail 530; ♀ 1940, tail 720 mm.

Range. Ceylon; Peninsular India, excluding the Ganges Valley west of Patna, B. & O. (*vide* Wall); Bengal; the Indo-Chinese region as far south as Rangoon in Burma; Siam; Cambodia; Cochin-China. It has not been met with in the north-eastern plateau-land of Siam or in other parts of French Indo-China.

Wall (1905 and 1921) has given excellent accounts of the habits of this snake. Like *prasinus* it is quite fearless and may be handled without difficulty. In my garden in Bangkok, where it was common, I often caught it and placed it among

the flowers on the table whilst we had a meal there it would remain almost motionless turning its head from side to side and watching us but seldom attempting to escape. When handled it has a peculiar habit of watching one's face and suddenly making a dart at it aiming usually for the eyes. Its food consists chiefly of lizards, small rodents and birds but it has been known to eat snakes. McCann (1934) records a lizard (*Calotes*) being seized by one and held struggling until it was dead 25 minutes later before being swallowed. Wall quoting Green in his *Snakes of Ceylon* p. 296 records the same habit and concludes 'the snake never commences to swallow its prey until all signs of life have ceased'. From 3 to 22 young are born at a time and this may occur during any month between March and December.

It is unfortunate that the well known name *mycterurus* must be transferred to another species but as shown by Anderson (1898) the snake which commonly bears this name is really *Boea xanthorhoa*.

287 *Dryophis pulverulentus*

BROWN WHIT SNAKE

Dryinus pulverulentus Dum. & Bb. 1854 *Erp. Gen.* vii, p. 81* (no type loc. given). Jan. Klenzo *Sat. Ophid.* 1863 p. 84, and *Icon. Gen. Ophid.* Liv. 3^e pl. v. fig. 1. — *Dryophis pulverulentus* Boulenger *P. B.* 1 1890 p. 371 and *Cat. Sn. Brit. Mus.* iii, 1896 p. 184. Wall, *J. Bombay N. H. S.* xxi, 1913, p. 639 and *xxv*, 1919 p. 574, and *xxix*, 1924 p. 378, and *Sn. Ceylon*, 1921 p. 302. McCann, *J. Bombay N. H. S.* xlii, 1940 p. 200.

Pseustes purpurascens Günther 1854, *Rept. Brit. Ind.* p. 306 pl. 23 F (Ceylon; London).

Like *nasutus* differing as follows. — Dermal appendage longer sometimes longer than the eye formed below by the rostral covered above by small scales no median groove above nasals often in contact with one another in front of the internasals. V 179-193 C 151-178 (Ceylon) V 182-203 C 169-208 (S. India) A 2.

Greyish or brownish powdered with brown, and with blackish transverse or oblique spots above a dark brown rhomboidal spot on the top of the head and a brown stripe on each side passing through the eye.

Total length ♂ 1125 tail 470 ♀ 1730 tail 710 mm.

Range The Western Ghats (Karwar N. Kanara Nilgiris Castle Rock Nellampatty Hills Travancore) Ceylon. Found in the plains and in the hills up to 3000 feet.

Subfamily HOMALOPSINÆ.

FRESHWATER SNAKES.

Homalopsidæ, Günther, 1864, Rept. Brit. Ind. p. 275.—*Homalopsinæ*, Boulenger, F. B. I. 1890, p. 372, and Cat. Sn. Brit. Mus. iii, 1896, p. 1; Werner, Arch. Naturg. Berlin, lxxxix, 1923, 8, p. 158; Smith, P. Z. S. 1931, p. 398.

Dentition well developed, the last two, sometimes three, maxillary teeth grooved and usually enlarged. Nostril crescentic, on the upper surface of the snout; eye small, directed more or less upwards; head shields often broken up; ventrals moderately well developed or narrow. Body usually stout; tail moderate or short. Hypapophyses developed throughout the vertebral column.

Thoroughly aquatic snakes, but often found on land in the vicinity of water; all of them appear to be equally at home both in fresh and salt water. They feed chiefly on fish, which are often swallowed under water. They bring forth living young.

In accordance with their aquatic habits and the need for complete closure of the mouth, the rostral shield is never deeply excavated, as in most of the Colubrinæ. It is provided, in addition, with a more or less distinct downward-projecting tongue of tissue, the structure being best developed in those species that live an entirely aquatic existence (Smith, 1931). The closure of the nostril is discussed on p. 17.

The hemipenis, except for small variations in detail, does not differ throughout the subfamily, and the following description will serve for all.

The organ is short and is forked for about half its length; the distal end is finely calyculate, the lips of the cups being low and stiffened with small, blunt spines that may or may not project beyond the edges. This condition merges gradually into a median area where the calyces and spines are larger. Near or at the bifurcation there is a more or less abrupt transition to an area that is beset with large flat triangular papilla-like processes arranged in longitudinal series, each one ending in a small spine.

Range. From S.E. Asia (India to China) through the Indo-Australian Archipelago to the north coast of Australia. Of the ten genera known seven are monotypic and only *Enhydris* has more than two species. Eight of the genera inhabit the area covered by this work, the remaining two, *Myron* and *Heurnia*, occurring in Australia and New Guinea respectively. The distribution of the Homalopsinæ accords closely with that of the Sea Snakes (Hydrophiidæ).

Key to the Genera.

I Ventrals moderately well developed, not keeled

A Nasal shields in contact with one another

Parietals well developed scales smooth .. ENHYDRIS, p. 380
 Parietals distinct, scales strongly keeled . . . HOMALOPHIS, p. 390.
 Parietals more or less broken up, scales keeled CERNEXUS, p. 392.

B Nasals separated by the internasal.

Scales in 17 rows body not elongate . . . GERARDIA, p. 394.
 Scales in 25-29 rows body not elongate .. FORDONIA, p. 396
 Scales in 19 rows, body very elongate . . . CANTONIA, p. 397

II. Ventrals narrow bicarinate

Scales smooth . . . BITIA, p. 399
 Scales keeled, 2 rostral appendages HENFERTON, p. 400

Genus ENHYDRIS.

- Enhydris* Bonn. & Latr 1802, Hist Nat Rept iv, p 200 (type *cerulea* = *enhydris*)
Hyperhina Wagler 1830, Syst Amphib pp 132, 169 (type *Homalopsis aer* Boie)
Polamophis Cantor 1836, Tr Med. Phys. Soc. Calcutta, viii, p 139 (type *luningtonis*)
Ferania Gray 1842, Zool Mus p 67 (type *sieboldii*)
Rachis Gray, loc cit p 67 (type *indica*)
Miralia Gray, loc cit p 69 (type *alternans*)
Hypricopus Fitzinger, 1843, Syst Rept p 25 (type *plumbea*)
Pelophis Fitzinger, loc cit p 25 (type *alternans*)
Pythonomorphus Fitzinger, loc cit p 25 (type *sieboldii*)
Phytolopsis Gray 1849, Cat Sn. Brit Mus p 67 (type *punctata*)
Eurostus (not of Dallas, 1851) Dumeril, 1853, Mem. Acad. Sc. Fr xvii p 498 (type *dussumieri*)
Trigonurus Dumeril, loc cit p 498 (type *sieboldii*)
Tachyplotus Reinhardt, 1866, Vidensk. Meddel. p 161 (type *selemanni* = *punctata*)
Feranioides Carilleyle, 1869, J A. S. Bengal, xxxviii pp 192, 196 (type *jambaticus*)
Pythoporus Peters, 1871, Mon. Akad Berlin, p 576 (type *borneensis* = *punctata*)
Homalophis Peters loc cit. p 577 (type *doriae*)
Pseudoferania Ogilby, 1890, Proc Linn. Soc. N.S. Wales (2) v, p 51 (type *macleani*)
Dicurostus Berg, 1901, Com. Mus. Nac. Buenos Aires, p 290 (subet name for *Eurostus*)

Maxillary teeth 10 to 16, followed by a pair of slightly enlarged grooved fangs, eye small with vertical pupil. Head scarcely distinct from neck, with large shields, nasals in contact with one another, the internasal behind them; loreal present. Head depressed, body cylindrical, scales smooth, in 19 to 33 rows. Tail moderate, subcaudals paired. Common characters unless otherwise stated.—A suture from the nostril to the labial or the loreal, internasal broader than long, 1 pre- and 2 postoculars, temporals 1+2, posterior pair of genials separated by scales; anal divided.

Range. The Oriental Region; Southern China to Formosa; the Indo-Australian archipelago; N. Queensland. Some 16 species are known.

The "Hurriah" of Russell (Ind. Serp. i. 1796, p. 45, pl. 40), which was made by Daudin the type of *Hurria bilineata* (Mag. Encycl. An. 8, v. 1803, p. 434), has been generally referred to *Enhydris enhydris*, and it certainly resembles it closely in coloration and general configuration. It was described by Russell from a sketch of a head, neck and tail,

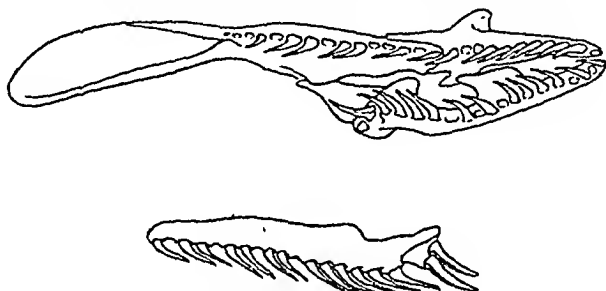


Fig. 121.—Maxilla and palato-maxillary arch of *Enhydris enhydris*.

and a description sent him by a correspondent, but was said to have the anterior subcaudal plates single, a character so far unknown in *Enhydris*.

Key to the Species.

- | | |
|--|-----------------------------|
| A. Scales in 19 rows | <i>plumbea</i> , p. 382. |
| B. Scales in 21–23 rows (rarely 25 in <i>chinensis</i>). | |
| I. Loreal in contact with the internasal. | |
| Scales in 21 rows; V. 116–145..... | <i>jagorii</i> , p. 384. |
| Scales in 21 (23 rows); V. 141–174..... | <i>enhydris</i> , p. 383. |
| Scales in 21 or 23 rows; V. 105–115; sides with black vertical bars | <i>innominata</i> , p. 385. |
| Scales in 21 rows; V. 118–121; black with light cross-bars or annuli | <i>smithi</i> , p. 385. |
| Scales in 23 (21) rows; 2 internasals; V. 129–137; C. 61–74 | <i>longicauda</i> , p. 386. |
| II. Loreal not reaching the internasal. | |
| Scales in 21 rows; V. 158–169; C. 47–53..... | <i>bennetti</i> , p. 386. |
| Scales in 23 (rarely 25) rows. V. 136–164; C. 36–52 | <i>chinensis</i> , p. 387. |
| C. Scales in 25–31 rows. | |
| Scales in 25 rows; loreal not in contact with the internasal; V. 120–130 | <i>maculosa</i> , p. 387. |
| Scales in 27 rows; loreal in contact with the internasal; V. 124–136 | <i>bocourti</i> , p. 388. |
| Scales in 27 rows; two internasals | <i>dussumieri</i> , p. 389. |
| Scales in 29–31 rows; two internasals | <i>sieboldi</i> , p. 389. |

288 *Enhydria plumbea*

- Homalopsis plumbea* Boie 1827 *Isis* p. 560 (Java; Leiden)
 Schlegel *Phys. Serp.* n. 1837 p. 346 pl. xii, figs 12 & 13 —
Hypselina plumbea Günther Rept. Brit. Ind. 1864, p. 280
 Boulenger F. B. I. 1890 p. 376 fig. and Cat. Sn. Brit. Mus.
 iii, 1898 p. 8 and Rept. Malay Pen. 1912, p. 160; Wall,
 J. Bombay N. H. S. xiii, 1924 p. 866 — *Enhydria plumbea*
 Pope Rept. China, 1935 p. 315, fig. Bourret, Serp. Indo-
 chine 1936 p. 276
Hypselina hardwickii Gray 1834, Ill. Ind. Zool. ii, pl. 57 fig. 1
 (Penang, London)

Snout broadly rounded internasal angle, not touching the loreal, which is about as long as high, frontal broader than

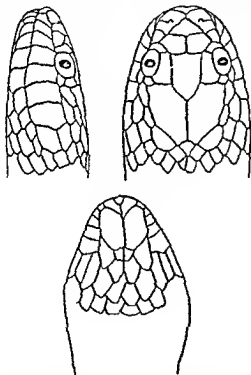


Fig. 122 — *Enhydria plumbea* (After Boulenger F. B. I. 1890)

the supraoculars 8 supralabials, 4th touching the eye 6th and 7th largest, anterior pair of genials not or scarcely longer than the posterior pair, in contact with 4-5 labials. Body moderately stout scales in 19 rows V 120-136 C. 29-45. Olive or greenish above uniform or with a series of small black spots usually on the vertebral line, outer 2-3 scale-rows

yellowish, uniform in the young, margined with grey in the adult; lower parts yellow or whitish, with or without a ventral series of dark spots; tail with a median black line or series of dots.

Total length: ♀ 380, tail 50 mm.

Range. Burma as far north as lat. 22°; Siam; French Indo-China; Hainan; southern China to Formosa; Hong Kong; the Malay Peninsula and Archipelago.

Enhydriis plumbea is not uncommon in Siam, but is more often met with in the vicinity of streams in hilly districts than near the coast. I obtained a specimen at Bockor, in the Elephant Mts., Cambodia, at 3,000 feet altitude; another was caught in the fishing-nets at Koh Lak in the Gulf of Siam.

It feeds on frogs and fish. It is extremely active in its movements and bites readily when caught, and in these respects differs from most of the other members of the genus that I have met with.

289. *Enhydriis enhydriis*.

Russell, 1796, Ind. Serp. i, p. 35, pl. xxx (Ankapilly Lake).

Hydriis enhydriis Schneider, 1799, Hist. Amph. i, p. 245 ("Indiæ orientalis").—*Hypsirhina enhydriis*, Günther, Rept. Brit. Ind. 1864, p. 281, pl. xxii, fig. K; Jan, Icon. Gén., Liv. 30, 1868, pl. iii, fig. 2 & pl. v, fig. 1; Theobald, Cat. Rept. Brit. Ind. 1876, p. 183; Boulenger, F. B. I. 1890, p. 376, and Cat. Sn. Brit. Mus. iii, 1896, p. 6; Wall & Evans, J. Bombay, N. H. S. xiii, 1900, p. 348, and 1901, p. 616; Wall, ibid. xix, 1910, p. 831, and xxi, 1912, p. 1017, col. pl. & map, and xxix, 1924, p. 866, and xxx, 1925, p. 817; D'Abreu, ibid. xxii, p. 203; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 127; Bourret, Serp. Indochine, 1936, p. 280.—*Enhydriis enhydriis*, Pope, Rept. China, 1935, p. 314, pl. xiii, figs. D-I; Shaw & Shebbeare, J. Darjeeling N. H. S. iv, 1929, p. 54.

Hydriis atrocaeruleus Shaw, 1802 Gen. Zool. Amphib. iii, p. 567 (based on Russell's "Mutta Pam").

Enhydriis caerulea Sonn. & Latr. 1802, Hist. Nat. Rept. iv, p. 202 (based on Russell's "Mutta Pam").

Coluber pythonissa Daudin, 1803, Hist. Nat. Rept. vii, p. 107.

Homalopsis aer Boie, 1826, Isis, p. 214, and 1827, p. 560.

Potamophis lusingtonii Cantor, 1836, Pr. Mod. Phys. Soc. Calcutta, viii, p. 139 (India).

Homalopsis olivaceus Cantor, 1839, P. Z. S. p. 55 (Bengal; col. sketch in Bodleian Lib.).

Hypsirhina trilineata Gray, 1842, Zool. Misc. p. 66 (India; London).

Hypsirhina furcata Gray, ibid. p. 66 (type loc. unknown; London).

Hypsirhina bilineata Gray, ibid. p. 66 (China: London).

Eurostus dussumieri Dum. & Bibr. 1854, Erp. Gen. vii, p. 953 (Bengal; Paris), Atlas, pl. 84.

Helicops indicus Annandale, 1905, J. A. Soc. Bengal, i (n.s.), p. 211, and corrigenda (Bengal).

Hypsirhina albolineata, Morice, 1875, Fauna Cochinchine, p. 58 (appears to be a *nom. nud.*: specimen in Lyons).

Snout broadly rounded; internasal single, twice as broad as long, in contact with the loreal: frontal broader than the

supraocular loreal subquadrangular in shape, 8 supra-labials 4th touching the eye last very small, anterior pair of genials smaller than the posterior pair, in contact with 4 labials. Body stout scales in 21 (rarely 23) rows V 141-174 C 46-70

There are two colour forms —

I Brownish greyish or olivaceous above with a dark vertebral stripe occupying from 4-8 scale rows, and bounded on either side by a pale stripe, most distinct on the hinder part of the body. Outer 3 scale rows whitish yellowish, buff or red, the colours sometimes alternating. Ventrals yellow or whitish margined laterally with brown and usually with a median series of brown spots, head brown above, indistinctly variegated with grey or with an indistinct dark stripe on each side through the eye. Juveniles have three light lines down the back a vertebral and two lateral, in the adult the vertebral line is usually lost.

II Brown above with three series of indistinct dark spots, a vertebral and two lateral extending down the whole length of the back and tail. In coloration this form closely resembles that of *jagori*.

Total length ♂ 645, tail 145, ♀ 810, tail 150 mm

Range N.E. India (United Provinces Vizagapatam district, Bihar and Orissa Bengal as far north as the Himalayan foot-hills) Assam Burma, Siam, French Indo-China, S China the Malay Peninsula and Archipelago

Fairly common in ponds, irrigated fields, and sluggish waters in Southern Burma, Siam and Cochinchina

It feeds principally on fish, but one sent to me in Bangkok disgorged a skink. In disposition it is quiet, and never attempts to bite when handled. From 6-18 young are produced at a time

290 *Enhydryis jagorii*.

Hyperhina (Eurostus) jagorii Peters, 1863, Mon. Akad. Berlin, p. 245 (Siam, Berlin).—*Hyperhina jagorii*, Günther, Rept. Brit. Ind. 1864, p. 282. Tirant, Rept. Batr. Cochinchine 1865 p. 1. Boulenger Cat. Sn. Brit. Mus. zool. 1896, p. 6, Flower P. Z. S. 1899 p. 678

Hyperhina enhydryis subternata Bourret, 1934, Bull. Gen. Instruct. Pub. Hanoi, March, p. 9 (Soc. Trang, Cochinchina, Paris), and Serp. Indochina, 1935, p. 232.

Snout blunt, squarish, internasal angle, twice as broad as long, in contact with the loreal, which is elongate, frontal broader than the supraocular, anterior pair of genials larger than the posterior pair, in contact with 4 labials. Body stout, scales in 21 rows, V 116-145, C. 38-61

Greyish or olivaceous above with more or less distinct blackish spots, usually arranged in pairs on the vertebral line, and with a series of larger angular or flower-shaped ones on

the flanks ; sometimes an indistinct light dorso-lateral stripe ; ventrals and outer 3 or 4 scale-rows yellow, pink, or whitish the outer margins of the ventrals and adjacent scale-rows heavily margined with grey ; sometimes a dark median ventral line or series of spots ; head grey above, speckled with darker.

Total length : ♀ 560, tail 90 mm.*

Range. The plain of Central Siam (Bangkok, Korat) ; Cochin-China ; Laos ; Kontum in Annam, lat. 16° 30' N.

291. *Enhydris innominata*.

Hypsirhina innominata Morice, 1875, Coup d'œil Faune Cochinchine, p. 58 (Tay-ninh, Cochinchina ; Lyon).—*Enhydris innominata*, Smith, J. Nat. Hist. Soc. Siam, viii, 1929, p. 49.

Internasal single, twice as broad as long, in contact with the loreal ; frontal broader than the supraocular ; loreal a little longer than high ; 8 supralabials, 4th touching the eye, last horizontally divided ; anterior pair of genials much larger than the posterior pair, in contact with 5 labials. Scales in 21 or 23 rows. V. 105–115 ; C. 40–51.

Greyish-brown above with small black spots arranged in three fairly regular longitudinal series ; flanks and belly yellowish-white, with broad, closely set black vertical bars which extend on to the outer margins of the ventral shields ; tail below and on the sides alternately banded with black and white.

Total length : ♀ 175, tail 72 mm.

Range. Cochin China. The type, a ♀, has 23 scales round the body. Five other specimens in the Paris Museum have 21 scales round the body.

292. *Enhydris smithi*.

Hypsirhina smithi Boulenger, 1914, J. Nat. Hist. Soc. Siam, i, p. 69 (Bangkok ; London).—*Enhydris smithi*, Smith, *ibid.* viii, 1929, p. 50.

Snout blunt, squarish ; internasal single, much broader than long, in contact with the loreal, which is about as broad as high ; frontal not much broader than the supraocular ; 8 supralabials, 4th touching the eye ; anterior pair of genials much longer than the posterior pair, in contact with 4–5 labials. Body very stout ; scales in 21 rows. V. 118–127 ; C. 54–56.

Black above, paler below, with narrow, more or less complete annuli which are pinkish above, yellowish below ; on the anterior part of the back these are linked together to form festoons ; head black with indistinct markings.

Total length : ♀ 680, tail 130 mm.

Range. Siam. I know of 4 specimens. Two were obtained

* This is the specimen recorded by Flower measuring 635 mm. in length when fresh.

in the river at Bangkok, a third on the sea-coast of Hus Hin in the Gulf of Siam, all are adult females. There is a juvenile in the Natural History Museum of Paris labelled "Siam".

This handsome snake is closely related to *sinoninalis* and may prove to be only a race of that species.

293 *Enhydris longicauda*.

Hyperhina longicauda Bourret, 1934, Bull. Instr. Pub. Gen. Hanoi, Sept. p. 20 (Cambodia; Paris), and Serp. Indochine, 1936 p. 284 fig. head.

Snout bluntly squarish; a pair of internasals in contact with the loreals, frontal broader than the supraocular; loreal longer than high, or divided into two by a vertical suture, 8 or 9 supralabials, 4th, or 4th and 5th, touching the eye; anterior pair of genials much larger than the posterior, in contact with 5 labials. Body stout, scales in (21) 23 rows. V 129-137, C 61-74.

Adult.—Greyish brown above, many of the scales white, margined with brown, a vertebral series of large, dark brown spots and two indistinct dark dorso-lateral stripes, lower parts pale brown with small whitish spots, one series of which forms a median ventral line, the colour of the back is continued on to the belly as indistinct V shaped marks, a series of light chevron shaped marks upon the tail. The young are dark brown above, with three longitudinal series of rounded, blackish spots, a vertebral and two dorso-lateral; the vertebral series, which are the larger, extend on to the tail, the dorso-lateral stop at the vent, lower parts black, this colour separated from the brown of the back by a fine light zig zag line, the angles of which correspond to the dorsal spots, a median series of light, transversely arranged spots, best marked anteriorly, and connected with the angles of the zig zag line by a series of small light spots; tail with light, transverse lines. Head dark brown above, with black and white markings, chin and throat white.

Total length 530, tail 145 mm.

Known from three specimens, an adult caught in the Great Lake (Tonlé Sap) of Cambodia, and two juveniles from the neighbouring district.

294 *Enhydris henneti*.

Hyperhina henneti Gray, 1842, Zool. Misc. p. 67 (China, London). Boulenger, Cat. Sn. Brit. Mus., iii, 1895, p. 8; Bourret, Serp. Indochine, 1936, p. 285.—*Enhydris henneti*, Smith J. Nat. Hist. Soc. Siam, vi, 1923, p. 203, Pope, Rept. China, 1935, p. 309 pl. xv.

Hyperhina maculata Dum. & Bibr. 1854, Exp. Gén. vii, p. 950 (China, Paris).—*Hyperhina enhydris* var. *maculata* Jac. Icon. Gén., Liv. 30 (1868), pl. iv, fig. 1.

Snout blunt, squarish, internasal small, well separated

from the loreal; frontal broader than the supraocular; loreal as long as high; 7 supralabials, 4th touching the eye, 6th-7th largest; anterior pair of genials about twice as large as the posterior pair, in contact with 4 labials. Body stout; scales in 21 rows. V. 158-169; C. 47-53.

Greyish-olive above, with two series of large ill-defined black spots, sometimes connected with one another upon the vertebral line; upper lip, sides of body (scale-rows 2 to 4), and lower parts, yellowish-white, the outer row of scales, ventrals and subcaudals heavily edged with grey; head grey above; the nape with a dark vertebral stripe.

Total length: ♀ 395, tail 95 mm.

Range. Hainan; Southern China.

I obtained three specimens in the Straits of Hainan (Hoi-how); they were caught at sea by the fishermen in their nets. They appear to be the only examples with exact data of locality.

295. *Enhydris chinensis*.

Hypsirhina chinensis Gray, 1842, Zool. Misc. p. 66 (China; London); Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 8; Bourret, Serp. Indochine, 1936, p. 287.—*Enhydris chinensis*, Smith, J. Nat. Hist. Soc. Siam, vi, 1923, p. 203; Pope, Rept. China, 1935, p. 311, pl. xiii, A, B, C.

Like *bennetti* in head scalation but the internasal larger.

Scales in 23, rarely 25, rows. V. 136-154; C. 36-52.

Grey above with small scattered black spots which are collected on the nape to form a vertebral line; upper lip, outer scale-rows, and lower parts yellowish-white; outer row of scales, ventrals, and subcaudals heavily edged with grey.

Range. Tong-King; Hainan; Southern China to Formosa.

Common in irrigated fields, ponds, and canals in Tong-King (Bourret) and in the lowlands of Southern China (Pope). According to Pope it is found also at considerable altitudes on the plateaus of Southern China, avoiding a true mountain environment. I obtained specimens at sea in the Straits of Hainan (Hoi-how). It feeds on fish and produces from 3 to 12 young at a time.

296. *Enhydris maculosa*.

Hypsirhina maculata (non Dum. & Bibr. 1854), Blanford, 1879, J. A. S. Bengal, xlviii, p. 130 (Pegu district).

Hypsirhina maculosa Blanford. 1881, P. Z. S. p. 226 (subst. name for *maculata*).

Hypsirhina blanfordi Boulenger, 1890, F. B. I. p. 377, and Cat. Sn. Brit. Mus. iii, 1896, p. 10; Slater, J. A. S. Bengal, 1891, p. 244; Wall, J. Bombay N. H. S. xxix, 1924, p. 866.

Snout blunt, squarish; internasal small, separated from the loreal, which is about as long as high; frontal broader

than the supraocular 7 supralabials 4th touching the eye last 2 largest anterior pair of genuals much larger than the posterior pair in contact with 4-5 labials Scales in 25 rows Body very stout V 125-130 C 33-45

Blackish ashv with 3 rows of largish irregularly-shaped black spots down the back each spot including several scales lower parts whitish the outer scale-rows and outer edges of the ventrals dark edged a series of dark spots down the middle of the ventrals

Total length 300 tail 45 mm

Range S Burma (Pegu district near Bassein) Known only from a few specimens

297 *Enhydryis bocourti*.

Hyphelasma bocourti Jan, 1865, Arch. Zool. Anat. Phys. iii, p 253 (Bangkok Paris) and Icon. Gén. Lav. 48, 1868 pl. v fig 2 Boulenger Cat. Poiss. Brit. Mus. iii, 1896, p 10 and Rept. Malay Pen. 191* p 161 Flower P. Z. S. 1899 p 876 Smith, J. Nat. Hist. Soc. Siam, I, 1914, p 100, photo and fig. Bourret, Serp. Indochine 1936 p 290

Hyphelasma multi-nebris Trant 1885 Rept. Batr. Cochinchina, p 41 and Mus. Pavia Indo China, Zool. 1904 p 484 (Cochin China; Paris)

Hyphelasma pygmaea Werner 1923 Ann. Naturhist. Mus. Wien, LXXVI, p 163 (type loc. unknown Vienna) Smith, Ann. Mag. Nat. Hist. (10) L, 1928, p 497

Hyphelasma bocourti acrotrungensis Bourret 1936 Serp. Indochine p 291 (Soo Trang Cochinchina; Paris)

Snout broadly rounded internasal usually undivided touching or just separated from the loreal frontal narrower than the supraocular loreal a little longer than high 7 or 8 supralabials 4th touching the eye last 1 or 2 horizontally divided anterior pair of genuals much larger than the posterior pair in contact with 5 labials Body very stout scales in 27 rarely 29 rows V 120-130, C 36-49

Young—Greenish black above with narrow yellow transverse bars or series of spots the intervening scales with or without a small median spot forming more or less distinct longitudinal lines lower parts yellow the dark colour of the back tapering into vertical bars on the sides of the body and forming complete or interrupted rings across the belly In the adult the dark green is replaced by olive and the markings are much less distinct

Total length ♂ 620 tail 100 ♀ 1140 tail 150 mm girth 140 mm

Range Siam as far north as Paknambo Cambodia Cochinchina the Malay Peninsula as far south as Kedah

Bocourti Water Snake is the largest both in length and girth of all the Homalopsinæ It is not uncommon in the low lying country in the vicinity of Bangkok and in Cochinchina Its temper is uncertain and its large size enables it

to inflict a very serious bite if handled carelessly. Those that I kept fed freely on frogs. A female obtained in Kedah by Major Flower gave birth to 17 young, their average length being 220 mm.

298. *Enhydri dussumieri*.

Eurostus dussumieri Dum. & Bibr. 1854, Érp. Gen. vii, p. 953, Atlas, pls. 77, 84 (1 Bengal; Paris).—*Hypsirhina dussumieri*, Jan, Icon. Gén. 1868, Liv. 30, pl. 3, fig.; Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 19.

Hypsirhina malabarica Werner, 1913, Jahrb. Wiss. Anst. Hamburg, xxx, (2) p. 26 (Cochin, Malabar coast; Hamburg).

Snout blunt, squarish; internasal longitudinally divided, just separated from the loreal; frontal about as broad as the supraocular; loreal squarish; 1 pre- and 2 postoculars; temporals 1+2; 8 supralabials, 4th touching the eye; anterior pair of genials much larger than the posterior pair, in contact with 5 infralabials. Body stout; scales in 27 rows. V. 144–150; C. 34–39; A. 2.

Brown above with three blackish longitudinal stripes, a vertebral and two dorso-lateral; outer three scale-rows whitish, spotted with brown and bordered above with white; ventrals whitish, the outer edges of the shields spotted with brown and with a median line of spots of the same colour.

Total length: 670, tail 75 mm.

The type of *dussumieri* is a female, and it was said to have come from Bengal. Herr P. de Grys has kindly compared my description of it with the type of *Hypsirhina malabarica* in Hamburg, and agrees with me that the two should be united. I do not know of any other specimens.

299. *Enhydri sieboldi*.

Homalopsis sieboldi Schlegel, 1837, Phys. Serp. ii, p. 349, pl. xciii, figs. 4 & 5 (Bengal; Leiden).—*Ferania sieboldi*, Günther, Rept. Brit. Ind. 1864, p. 284; Anderson, P. Z. S. 1871, p. 180; Murray, J. Bombay N. H. S. i, 1886, p. 219, pl.—*Hypsirhina sieboldi*, Jan, Icon. Gén., Liv. 30, 1868, pl. iv, fig. 2; Boulenger, F. B. I. 1890, p. 377, and Cat. Sn. Brit. Mus. iii, 1896, p. 11; Selater, J. A. S. Bengal, lx, 1891, p. 245; Wall, J. Bombay N. H. S. xi, 1898, p. 732, and xviii, 1921, pp. 117 and 920, and xxix, 1924, p. 866.

Feranioides jamnaticus Carlleyle, 1869, J. A. S. Bengal, xxxviii, p. 196 (Jumna R., near Agra; Calcutta).

Snout blunt, squarish; internasal longitudinally divided, touching or just separated from the loreal; frontal broader than the supraocular; loreal about as long as high; sometimes 2 preoculars, the lower of the two and the postocular often extending to below the eye; 7 or 8 supralabials, 4th touching the eye, last 1 or 2 horizontally divided; anterior pair of genials much larger than the posterior pair, in contact with 4 or 5 labials. Body stout; scales in 29 (rarely 31) rows. V. 147–158; C. 48–56.

Whitish or buff above, with dark brown, black-edged elliptical or rhomboidal, transverse, spots broader than their interspaces, a series of roundish spots on each side alternating with the dorsal spots; head with three dark brown longitudinal stripes confluent between the eyes, lower parts white, chequered with black.

Total length 780 tail 110 mm (♀)

Range India (Travancore, Bombay, Delhi, Agra, Saugor, Fyzabad, Pusa Patna Champaram, Mymensingh); Assam (Samaguting) Burma (Pegu, *de Wall*).

Genus HOMALOPSIS.

Homalopsis *Huttl & Hasselt*, 1822 *Alg Konst Lett Bode*, i, 7, p. 101 and *Is* 1822, p. 474 (type *Coluber horridus*), *Boulenger*, F. B. I. 1890 p. 373, and *Cat. Sn. Brit Mus.* iii, 1896, p. 13.
Pythonia *Blyth*, 1859, J. A. S. Bengal, xxviii, p. 297 (type *semisonata*).

Maxillary teeth 11 to 13, followed by a pair of slightly enlarged, grooved fangs; anterior mandibular teeth much longer than the posterior, eye small with vertical pupil; head distinct from neck, with large shields more or less complete, nasals in contact with one another, the internasal being behind them, loreal present; body cylindrical; scales striated and strongly keeled, in 39 to 47 rows, ventrals well developed, tail moderate, subcaudals paired. A single species.

300 *Homalopsis buccata*.

Russell, 1801, *Ind. Serp.* ii, p. 39, pl. xxxiii (Java).
Coluber buccatus *Linnaeus*, 1754, *Mus. Ad. Frid.* p. 29 pl. xix, fig. 3 and *Syst. Nat.*, 10th ed. 1758, p. 217 (India).—*Homalopsis buccata*, *Günther* *Rept. Brit. Ind.*, 1864, p. 285; *Boulenger*, F. B. I. 1890 p. 374, fig., and *Cat. Sn. Brit. Mus.* iii, 1896, p. 14, and *Rept. Malay Pen.* 1912, p. 182; *Wall*, J. Bombay N. H. S. xxix, 1924, p. 867, and xxx, 1925, p. 817; *Smith*, J. Nat. Hist. Soc. Siam, i, 1914, p. 101. *Bourret*, *Serp. Indochine*, 1936, p. 293.
Coluber monolis *Linn.*, 1758, *Syst. Nat. Ed.*, 10, p. 221 ("America"); *Anderson*, *Bih. Svenska Vet. Akad.* Stockholm, xxiv, 1893, iv, 8 p. 34.
Coluber subulbidus *Gmelin*, 1783, *Syst. Nat.* iii, p. 1103, based on *Seba*, ii, pl. 21, fig. 3).
Coluber horridus *Daudin*, 1803, *Hist. Nat. Rept.* vii, p. 71.
Homalopsis hardwickii *Gray*, 1842, *Zool. Musc.* p. 65 (India; London).
Homalopsis semisonata *Blyth*, 1855 J. A. S. Bengal, xxiv, p. 187 (Martaban; Calcutta).

Snout broadly rounded, nostril connected by suture to the first labial, internasal often divided by a longitudinal suture; prefrontals sometimes separated by an axygous scale; frontal usually broken up into two or more pieces, the anterior half entire, usually narrower than the supraocular, parietals

short, about as broad as long, usually entire; loreal elongate, sometimes divided by a vertical suture, not touching the internasal; 1 pre- and 2 postoculars; often 2-3 suboculars separating the eye from the labials; temporals small, scale-like; 10-12 supralabials, 5th and 6th below the eye, those posterior to it usually divided horizontally: 2-3 pairs of

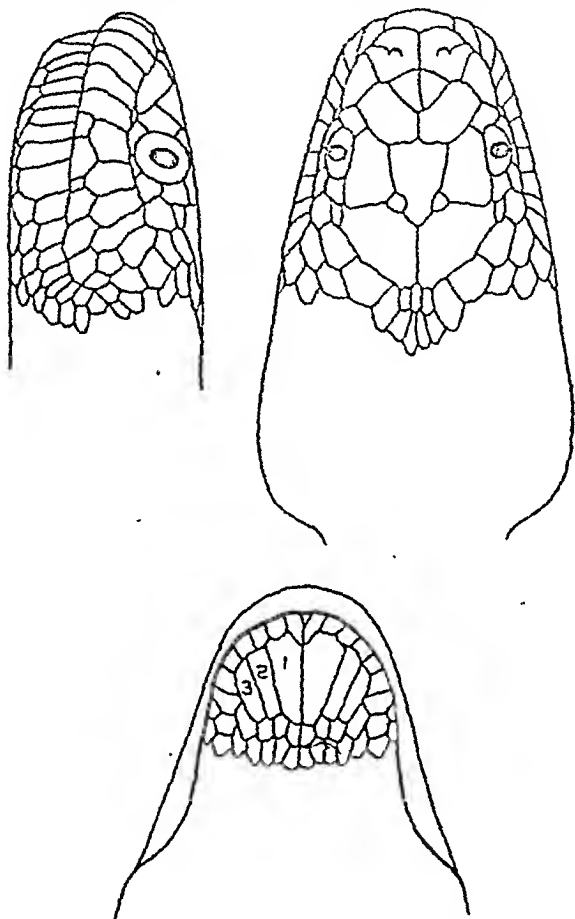


Fig. 123.—*Homalopsis buccata*. (After Boulenger, F. B. I. 1890.)

genials in a transverse row, inner largest and in contact with the first three labials. Scales in 43-47, usually 45, rows. V. ♂ and ♀ 160-176; C. ♂ 78-103; ♀ 70-91 (for specimens from the Indian and Indo Chinese regions).

Young blackish above with narrow white cross-bars, usually a broad one alternating with a narrow one, the latter often incomplete; head white above with regular black and brown

markings, namely a triangular spot on the tip of the snout a stripe passing through the eye to the angle of the mouth, and an oval spot on the parietal region. Lower scale-rows and ventrals white the latter with a series of small black spots on their outer edges sometimes absent. Tail below thickly spotted with dark brown or black.

With age the markings become indistinct and fully grown individuals are dark greenish or deep plum-coloured above the light cross-bars being dull yellowish in colour margined with black. Belly yellow. Throat white.

An example from Eastern Siam (B.M. Coll.) has the whole of the lower parts grey thickly spotted with black.

Total length ♂ 700 tail 190 ♀ 1310 tail 283 mm.

Range Rivers, canals and ponds of Burma south of lat 17° Siam Cambodia Cochinchina, the Malay Peninsula and Archipelago. Common in southern Indo-China usually not found far above tidal limits.

Of sluggish disposition never attempting to bite when handled feeding on fish and frogs. From 9-21 young are born at a time. Individuals that I kept in captivity spent most of their time on land and burrowed frequently into the mud of their cage.

Genus CERBERUS.

Cerberus Cuvier 1829 Reg. Anim. 2nd ed. ii. p. 81 (type *Celuber cerberus*). Boulenger F.B.L. 1890, p. 374 and Cat. Fish. Brit. Mus. ii. 1896 p. 15. Smith, Bull. Raffles Mus. no. 2, 1950, p. 81. *Horus* Daudin, Mag. Encyclop. An. R. v. p. 434; Stejneger 1907 Herpet. Japan, p. 304.

Maxillary teeth 12 to 17 parietal shields broken up into

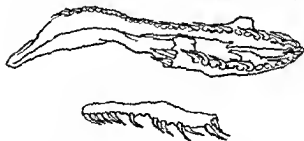


Fig 124.—Maxilla and palato-maxillary arch of *Cerberus rhynchops*

small scales. Scales in 21-23 rows. Other characters as in *Homalopsis* but the head shields less regular in outline. Three species have been described. *australis* is scarcely more than a race of *rhynchops* the third (*microlepis*) inhabits the Philippines.

301. *Cerberus rhynchops*.

Russell, 1796, Ind. Serp. i, p. 23, pl. xvii (Ganjam), and ii, 1801, pl. xl (no locality given).

Hydrus rhynchops Schneider, 1799, Hist. Amph. i, p. 246 (based on Russell, pl. xvii).—*Cerberus rhynchops*, Günther, Rept. Brit. Ind. 1864, p. 279; Anderson, P. Z. S. 1871, p. 179; Murray, Zool. Sind, 1884, p. 381; Boulenger, F. B. I. 1890, p. 374, and Cat. Sn. Brit. Mus. iii, 1896, p. 16, and Rept. Malay Pen. 1912, p. 163; "Keswal," J. Bombay N. H. S. i, 1886, p. 173; Wall & Evans, ibid. xiii, 1900, pp. 345 and 612; Alcock & Rogers, Proc. Roy. Soc. London, 1902, p. 449; Annandale, J. A. S. Bengal, 1905, p. 176, and Mem. Ind. Mus. v, 1915, p. 170; Wall, J. Bombay N. H. S. xvi, 1905, p. 307, and xxvi, 1919, p. 89, col. pl. and Sn. Ceylon, 1921, p. 257; Bourret, Serp. Indochine, ii, 1936, p. 205; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 102; Kopstein, Treubia, Buitenzorg, xiii, 1931, p. 3.—*Hurria rhynchops* Wall, J. Bombay N. H. S. xxix, 1924, p. 867; Prater, ibid. xxx, 1924, p. 171.

Elaps boeiformis Schneider, 1801, Hist. Amph. ii, p. 301 (type loc. not given).

Hydrus cinereus Shaw, 1802, Gen. Zool. iii, p. 567 (based on Russell, pl. xvii).—*Cerberus cinereus*, Cantor, 1839, P. Z. S. p. 54 (Bengal; col. sketch in Bodleian Library).

Hurria schneideriana Daudin, 1803, Hist. Nat. Rept. v, p. 281 (substit. name for *Elaps boeiformis*).

Coluber cerberus Daudin, 1803, Hist. Nat. Rept. vii, p. 167 (based on Russell, pl. xvii).

Homalopsis molurus Boie, 1826, Isis, p. 213 (based on Russell, pl. xl).

Cerberus grantii Cantor, 1836, Tr. Med. Phys. Soc. Calcutta, viii, p. 135 (India).

Coluber obtusatus Reinhardt, 1837, in Schlegel, Phys. Serp. ii, p. 341.

Homalopsis schneideri Schlegel, 1837, Phys. Serp. ii, p. 341, pl. xiii, figs. 6 & 7.

Cerberus russelli Cuvier, 1837, in Schlegel, Phys. Serp. ii, p. 342 (Pondicherry).

Cerberus acutus Gray, 1849, Cat. Sn. Brit. Mus. p. 65 (Borneo; London).

Cerberus unicolor Gray, ibid. p. 65 (Philippines; London).

Snout broadly rounded: nostril connected by suture to the first labial; internasal divided by a longitudinal suture; frontal broken into small scales, the anterior half usually being distinct; loreal large, higher than long, extending well on to the upper surface of the snout, in contact with, or just separated from, the internasal; 1 pre-, 1 post- and 2 suboculars; temporals small, scale-like; 9-10 supralabials, 5th and 6th below the eye, the last 2 or 3 horizontally divided; 3 pairs of genials, anterior largest, in contact with 4 infralabials; the remaining pairs separated by small scales and partly wedged in between the anterior genials and the labials. Scales striated and strongly keeled, in 23-25, rarely 21, rows, the laterals scarcely larger than the median. V. (122) 137-159; C. 50-68; A. 2.

Greyish, brownish or olivaceous above with more or less distinct dark spots or cross-bars; a black streak on the side of the head, passing through the eye and on to the neck,

always distinct in the young, lower parts from pale to deep yellow, variegated or barred with black or almost entirely dark grey the outer 3 scale rows usually entirely yellow

Total length ♂ 770 tail 115, ♀ 1000, tail 180 mm

Range Coasts and tidal rivers of India and Indo-China from Bombay to Cochin China, Ceylon, the Andaman and Nicobar Islands, the Malay Peninsula and Archipelago

A comparatively rare snake on the coasts of India but exceedingly common in southern Burma and the Gulf of Siam, at or near the mouths of rivers; it has been found in fresh water more than 100 miles from the coast. Of quiet and inoffensive disposition, it feeds on fish and has often been caught by anglers on their hook. From 8 to 26 young are born at a time, they measure from 175-200 mm in length

Genus GERARDIA.

Gerarda Gray 1849, Cat Sn Brit Mus p 77 (type *bicolor*)—*Gerardia* Boulenger, F B I 1890, p 379, and Cat Sn Brit Mus in 1896 p 20

Campylodon (not of Cuvier 1832) Dumeril, 1833, Mem. Ac. Sc. France, xiii p 499, and Dum. & Bibr. Exp. Gén. vii, 1854 p 963 (type *prevostianum*)

Heleophis F. Müller, 1884, Verh. Nat. Ges. Basel, vii, p 286 (type *flavescens*)

Maxillary bone extending beyond the palatine, with 11 to 13 teeth, followed by two strongly enlarged, backwardly projecting grooved fangs, mandibular teeth subequal. Eye small, with vertical pupil, head not distinct from neck, with large shields nasals separated by an internasal; loreal present. Body cylindrical, scales smooth, in 17 rows, ventrals well developed, tail short, subcaudals paired

A single species

302 *Gerardia prevostiana*.

Coluber (*Homalopsis*) *prevostianus*, Eydoux & Gervais, 1832-1837, in Quér. Mag. Zool. Cl. iii, p 6, col. pl 16 ("Manila")—*Gerardia prevostiana* Boulenger, F B I 1890, p 379, and Cat Sn Brit Mus in, 1896, p 20; Wall & Evans, J. Bombay N H S xii, 1900 p 616, Wall ibid xvi 1905, p 307, and Sn. Ceylon, 1921 p. 267, and J. Bombay N H S xxx 1924, p 868. Smith, Bull. Raffles Mus., no 3 1930, p 62. Prater, J. Bombay N H S xxx, 1924 p 171

Gerarda bicolor Gray, 1849 Cat Sn Brit Mus p 77 (type locality unknown; London), Günther, Ann. Mag. Nat. Hist. (4) i 1868 p 421, Theobald, Cat Rept Brit Ind 1876, p 180

Heleophis flavescens F. Müller, 1884, Verh. Nat. Ges. Basel, vii, p 286, pl v, fig 2

Nostril in the nasal, frontal much broader than the supraocular, 1 pre- and 2 postoculars, loreal not in contact with the internasal, temporals 1+2 or 2+2; 7, rarely 8, supra-labials, 4th touching the eye, 8th when present, very small; 2 pairs of genials, the anterior pair much the larger, in contact

with 4 labials, posterior pair separated by scales; dorsal scales subequal. V. 145-153; C. 29-36; A. 2.



Fig. 125.—Palato-maxillary arch and maxilla of *Gerardia prevostiana*.

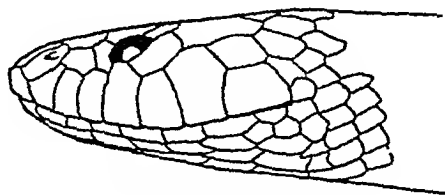
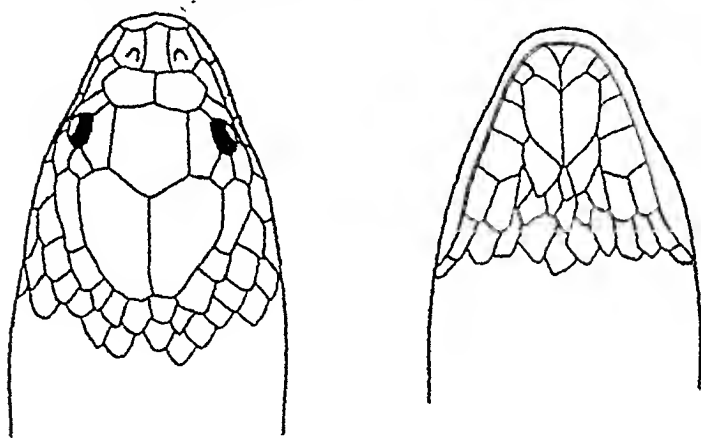


Fig. 126.—*Gerardia prevostiana*.

Light or dark grey or brown above, uniform; upper lip, chin and 3 outer rows of scales white; ventrals whitish with dark edges or entirely grey.

Total length: ♀ 525; tail 62 mm.

Range Coasts and tidal rivers of India (Bombay and Malabar districts), Ceylon (Kelani river); Burma (Gulf of Martaban) W coast of the Malay Peninsula

Genus FORDONIA.

- Fordonia* Gray 1842, Zool. Misc. p. 67 (type *leucobalia*), Boulenger, F B L. 1890 p. 378 and Cat. Sn. Brit. Mus. iii, 1936 p. 21.
Hydropus Fitzinger 1843, Syst. Rept. p. 25 (type *Homalopus leucobalia* Schleg.)
Hemidontus Dumeril, 1853, Mem. Acad. Sci. France, xxiii, p. 494, and Dum. & Bibr., Exp. Gén. vii, 1854, p. 883 (subst. name for *Fordonia*).

Maxillary bone with an edentulous space in front extending beyond the palatine, with 6 to 8 teeth followed after a short interval by 2 enlarged grooved teeth, mandibular teeth subequal eye very small, with vertical pupil, head not distinct from neck, covered with large shields, nasals separated by the internasal normally no loreal; body cylindrical, rather stout, scales smooth, in 25-29 rows, ventrals well developed, tail short subcaudals paired

A single species

303 *Fordonia leucobalia*

- Homalopus leucobalia* Schlegel, 1837, Phys. Serp. ii, p. 345, pl. xiii, figs 8 & 9 (Tunor, Leyden).—*Hemidontus leucobalia*, Jan. Icon. Gen. 1868, Liv. 28, vi, fig. 1.—*Fordonia leucobalia*, Boulenger F B L. 1890 p. 378, and Cat. Sn. Brit. Mus. iii, 1896 p. 21 and Rept. Malay Pen. 1912, p. 164, De Rooij, Rept. Indo-Austral. Arch. ii, 1917 p. 189, fig. 1, Wall & Evans, J. Bombay N. H. S. xii, 1900, p. 347, Annandale, J. A. S. Bengal, 1903 p. 176, Wall, J. Bombay N. H. S. xiii, 1924, p. 869, Kopstein, Treubia, Buitenzorg xiii, 1931, p. 1; Bourret, Serp. Indo-Chine, 1936 p. 299.
Fordonia unicolor Gray, 1849, Cat. Sn. Brit. Mus. p. 77 (Borneo, London).
Hemidontus chalybeus 1863, Jan. Elenoo, p. 79, and Icon. Gén. 1868, Liv. 28, vi, fig. 3 (Singapore, Milan. Based on an abnormal specimen, the internasal being absent, *Ides* Boulenger F B L.)
Fordonia bicolor Theobald, 1883, J. Linn. Soc. London, p. 56 (near Rangoon).
Fordonia corvobalis Macleay, 1878, Pr. Linn. Soc. N. S. Wales, ii, p. 219 (Port Darwin).

Nostril in the nasal, frontal much broader than the supraocular, rarely a small loreal, 1 pre- and 1-2 postoculars, 1-2 anterior temporals, irregular in size and shape, 5 supralabials, 3rd touching the eye, 5th longest, 2 pairs of genials, subquadrangular in shape, the anterior in contact with 3-4 labials. Scales in 25-27 rows in the Oriental Region. V 138-156, the last 1-2 often divided, C. 28-43

Greyish or brownish above, uniform or with small black spots in the young. whitish or yellowish below

This form, var. *unicolor*, is found throughout the whole range of the species, but is the only one found in the Oriental Region; var. *leucobalia* is restricted to the seas south of the Equator.

Total length: ♂ 680, tail 100; ♀ 940, tail 125 mm.

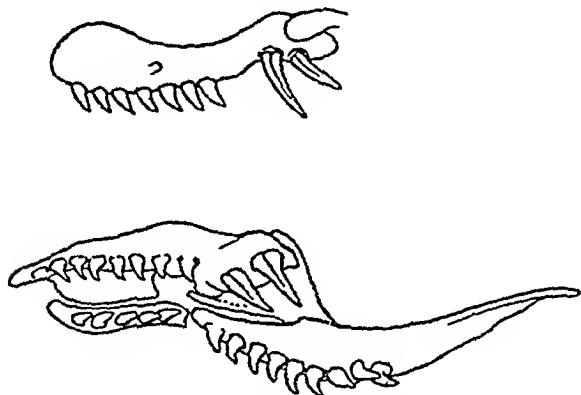


Fig. 127.—Maxilla and palato-maxillary arch of *Fordonia leucobalia*.

Range. Tidal rivers and coasts of Bengal (Sandarbans), Burma and Cochin-China; the Nicobar Islands; the Indo-Australian Archipelago to N. Australia.

Kopstein (1931) states that it is fairly common at Cheribon on the N. Coast of Java, living on crabs and inhabiting their holes.

Genus CANTORIA.

Cantoria Girard, 1857, Proc. Acad. Nat. Sci. Philad. p. 182 (type *violacea*); Günther, Rept. Brit. Ind. 1864, p. 278; Boulenger, F. B. I. 1890, p. 380, and Cat. Sn. Brit. Mus. iii, 1896, p. 23.
Hydrodipeas Peters, 1859, Mon. Akad. Berlin, p. 270 (type *elapiformis*).

Maxillary bone projecting beyond the palatine, with 9 to 11 teeth, followed after an interval by a pair of enlarged grooved fangs; anterior mandibular teeth longest. Eye small with vertical pupil. Head not very distinct from neck, with large shields; nasals separated by the internasal; loreal present. Body cylindrical, elongate; scales smooth, in 19 rows; ventrals moderately or well developed, not keeled; tail moderate, slightly compressed, subcaudals paired.

Two species; the second, *C. annulata* de Jung, inhabits New Guinea.

304 *Cantoria violacea*

- Cantoria violacea* Girard, 1857, Proc. Ac. Nat. Sci. Philad. p. 182 (Singapore), and U.S. Explor. Exped. Herp. 1853, p. 156, & Atlas, col. pl. xi, figs 7-10, Boulenger, F. B. I. 1890, p. 380, fig., and Cat. Sn. Brit. Mus. vi, 1896, p. 23, and Rept. Malay Pen. 1912 p. 165, Wall & Evans, J. Bombay N. H. S. xii, 1901 p. 612 Wall, ibid. xxii, 1914, p. 166, and xxix, 1924, p. 868, De Rooij, Rept. Indo-Austral. Arch. ii, 1917, p. 191, fig. *Hydrophis elapiformis* Peters, 1859, Mon. Akad. Berlin, p. 270, pl.—, fig. 1—*Hemiodontus elapiformis*, Jan. Icon. Ophid. 1868, Liv. 28 pl. vi, fig. 2.
- Cantoria elongata* Günther, 1864, Rept. Brit. Ind. p. 277 (based on Girard's specimen).
- Cantoria dayana* Stoliczka, 1870, J. A. Soc. Bengal, xxxix, p. 203, pl. xi, fig. 5 (mouth of Mouhnein R.: type lost); Anderson, P. Z. S. 1871, p. 178.

Nostril in the nasal, frontal much broader than the supra-ocular, parietals elongate, loreal well separated from the

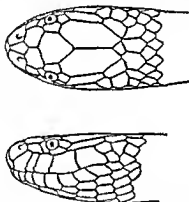


Fig. 128.—*Cantoria violacea* (After Boulenger, F. B. I. 1890)

internasal, 1 pre-, 1 post- and 1 subocular, 1 long anterior temporal, 5 supralabials, 3rd and 4th below the eye, last 2 largest, 2 pairs of genuals in contact with one another, the anterior pair larger, in contact with 4 labials; dorsal scales subequal V 260-291, a little more than half the breadth of the body. C 53-57; A 2. A specimen from Ross I in the Andamans has 244 ventrals and 69 caudals.

Two colour forms—

1 Blackish above with yellow transverse bands, narrower than their interspaces on the vertebral line, widening and as broad as or broader than their interspaces on the sides of the body; head with white spots, whitish below, or with grey markings continued from the dark colour of the back, on the tail they form complete rings.

2. Dark brown above, with narrow white cross-bars ; outer scale-rows and belly white ; head as in 1.

Total length : ♀ 1200, tail 140 mm.

Range. Tidal rivers and coasts of Burma and the Malay Peninsula, from the Gulf of Martaban to Singapore ; the Andaman Is. ; the Indo-Australian Archipelago.

Genus BITIA.

Bitia Gray, 1840, Syn. Cont. Brit. Mus., ed. 42, p. 42 (nom. nud.), and Zool. Misc. 1842, p. 64 (type *hydroides*).

Hipistes Gray, 1849, Cat. Sn. Brit. Mus. p. 77 (type *fasciatus*) ; Boulenger, F. B. I. 1890, p. 381, and Cat. Sn. Brit. Mus. iii, 1896, p. 24.

Maxillary bone projecting beyond the palatine, with 11 to 13 teeth, followed after an interval by a pair of slightly enlarged grooved fangs ; anterior mandibular teeth largest. Eye small, pointing almost directly upwards, with vertical pupil. Head scarcely distinct from neck, with small shields ; nasals

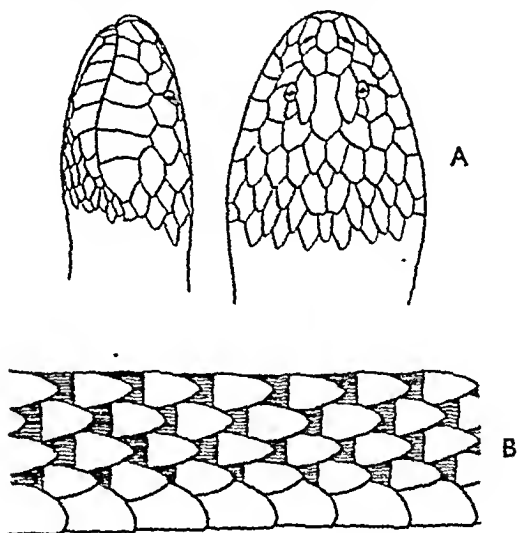


Fig. 129.—*Bitia hydroides*. A. Dorsal and lateral views of head. (After Boulenger.) B. Dorsal scales $\times 3$.

separated by the internasal ; nasal cleft transversely dividing the nasal shield ; parietals broken up. Body cylindrical, scales smooth, in 37-43 rows ; ventrals rather narrow, with two strong lateral keels. Tail short, feebly compressed, sub-caudals paired.

A single species.

305 *Bulia hydroides*.

- Bulia hydroides* Gray 1842, Zool Musc p 64, and Cat Sn. Brit Mus 1849 p 63 (type locality unknown, London)
Homalopsis hydryna Cantor, 1847, Cat Malay Rept p 104, pl. xl, fig 4 (Coast of Kedah, Malay Peninsula) — *Hypsiotes hydryna*, Gunther Rep. Brit Ind. 1864, p 287, pl. xxiv, fig H, Stolozska, J A S Bengal, xxix, 1870 p 207; Anderson, F Z S 1871, p 181 Theobald, Cat Rept Brit Ind 1876, p 184, Boulenger, F B I. 1890 p 382, fig. and Cat Sn. Brit Mus iii, 1896, p 24, and Rept Malay Pen 1912, p 166; Wall & Evans, J Bombay N H. S. xiii, 1900 & 1901, pp 347 and 616, Wall, ibid. xxix, 1924 p 868
Hypsiotes fasciatus Gray, Cat Sn Brit Mus 1849 p 78 (E Indies, London)

Nasal shield almost or completely divided into an anterior and posterior portion by the nasal cleft, frontal long and narrow, not much broader than the supraocular, loreal well separated from the internasal, a long preocular, a small postocular and a large post-subocular, parietals divided into regular scales temporals 1+2, 7 supralabials, 4th below the eye 5th and 6th highest, anterior pair of genials much longer than the posterior pair, in contact with 5 labials. Dorsal scales elongate, entirely attached to the interstitial skin and leaving a gap between the base of one scale and the apex of the one preceding it*. Ventrals narrow, about half as broad as the body, ♂ & ♀ 157-172, C ♂ 31-35, ♀ 21-27

Pale greyish above, with blackish cross bars, as broad as or a little narrower than their interspaces; head grey, outer scale-rows and lower parts white Wall and Evans (1900) describe it in life as having "alternate yellow and black dorsal bars the belly buff The colours on the back are bright and the scales glazed like enamel"

Total length ♀ 450, tail 35 mm

Range Coasts and tidal rivers of Southern Burma, the Malay Peninsula and Siam Apparently common in the Gulf of Martaban.

Two females obtained in September by Wall & Evans contained three and four fully formed embryos, respectively

The type of *Bulia hydroides* is much deteriorated, but the characters are sufficiently distinct to be sure of the identification

Genus HERPETON.

- Erpeton* Lacépède, 1800, Bull. Sc. Soc. Phil. Paris ii, p 189 (type *tentaculatus*) — *Herpeton* Günther, Rept Brit Ind. 1864, p. 233; Boulenger Cat Sn. Brit Mus iii, 1896, p 25
Rhinopirae Merrem, 1820, Tent Syst Amph. pp 14 & 81 (substantive name for *Erpeton*)

Maxillary bone not extending as far forwards as the palatine, with 12 to 14 teeth, followed by a pair of grooved

* A condition found also in the *Xenodermus* see pp 123-129

fangs which are not larger than the preceding teeth ; anterior mandibular teeth largest. Eye small with subelliptic or rounded pupil. Head distinct from neck, with large shields ; two rostral appendages, covered with small scales. Body depressed, with strongly keeled scales, in 35-39 rows ; ventrals very narrow, bicarinate. Tail moderate, no distinct subcaudals.

A single species.

306. *Herpeton tentaculatum*.

Erpeton tentaculatus Lacépède, 1800, Bull. Sci. Soc. Phil. Paris, ii, p. 169, and Ann. Mus. Nat. Hist. Paris, ii (10), 1803, p. 284, pl. L (type locality unknown).—*Herpeton tentaculatum*, Günther, P. Z. S. 1860, p. 114, col. pl. xxiii ; Morice, Ann. Sci. Nat. Paris (6), ii, 1875, (5) pl. xx ; Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 25 ; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 103, photo head ; and Bull. Raffles Mus. no. 3, 1930, p. 63 ; Gyldenstolpe, Kungl. Vet. Akad. Stockholm, lv, 1916, p. 19 ; Bourret, Serp. Indochine, 1936, p. 305, fig.

Rostral separated from the nasals by small scales ; nasals usually in contact with one another ; internasal longitudinally divided ; an azygous scale between it and the prefrontals ; frontal large, much broader than the supraoculars, separated from them by small scales ; loreal region covered with small scales ; 1 pre- and 1 postocular ; temporals small, scale-like, strongly keeled ; 13-15 supralabials, separated from the eye by suboculars ; 3-4 pairs of narrow genials in a more or less transverse series. Scales in 35-39 rows, very strongly keeled : ventrals small, about twice as broad as the adjacent scales, bicarinate, 109-136. Rostral appendage about as long as its distance from the eye.

Reddish-brown above with two ill-defined dark, longitudinal stripes, one on either side of the vertebral line, the intervening area having dark spots or cross-bars, or almost entirely dark brown ; a broad dark lateral stripe, starting from the snout and passing through the eye, divided on the body into an upper and a lower portion by a light interval ; below yellowish-brown, with a dark stripe on either side of the ventral shields, and usually a series of black, and white or orange, spots or short bars along the outer margin, the light spot in front. Some individuals are very dark grey in colour, the only conspicuous markings being the light spots underneath.

Total length : ♀ 770, tail 195 mm.

Range. Peninsular and Central Siam ; Cambodia ; Cochinchina.

Annandale obtained it in the inland sea at Singgora, and this is its most southern range. It is not uncommon in ponds and sluggish waters in the country round Bangkok if one knows where to look for it, and, according to Bourret,

it is not rare in Cambodia and Cochin China. It is entirely aquatic in its habits and on land is almost helpless. It feeds on fish. When handled it neither attempts to bite nor escape. The stiff unbending attitude which it adopts when caught has earned for it the Siamese name of 'ngu kradau' or the snake like a board. The tentacles are not sensitive and have a considerable range of movement. When the snake lies beneath the water they are pointed in a forward direction with the snout projecting above the water—

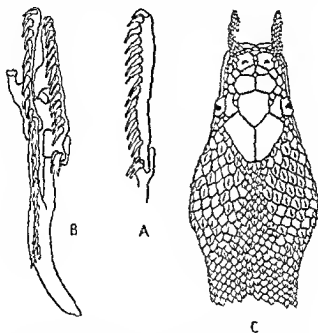


Fig 150.—*Herpetodon* tentaculation.

A Maxilla. B Palato maxillary arch. C Dorsal view of head.

common position for the creature to assume—they are laid back on either side of the snout. The function of the tentacles if any is not known but it is possible that in movement they would act as a bait to attract fish. From 9 to 13 young are produced at a time.

Family DASYPELTIDÆ.

Rachiodontina Günther, 1858, Cat. Col. Sn. Brit. Mus. p. 141;
 Reinhardt, Overs. Dansk. Vid. Selsk. Forh. 1863, p. 198.—
Rachiodontina, Boulenger, Cat. Sn. Brit. Mus. ii, 1894, p. 353.
Elachistodontina Boulenger, 1896, Cat. Sn. Brit. Mus. iii, p. 263.

Palato-maxillary arch edentulous except for a few minute teeth; anterior thoracic vertebræ with the hypapophyses much developed, penetrating the wall of the œsophagus.

Two genera, namely the aglyphous African *Dasypeltis* and the opisthoglyphous Asiatic *Elachistodon*, both monotypic.

The grooved teeth of *Elachistodon* can no longer be regarded as sufficient to maintain it in a family distinct from that of *Dasypeltis*.

The enlarged hypapophyses of the thoracic vertebræ are developed in the same way in both genera. In the specimen

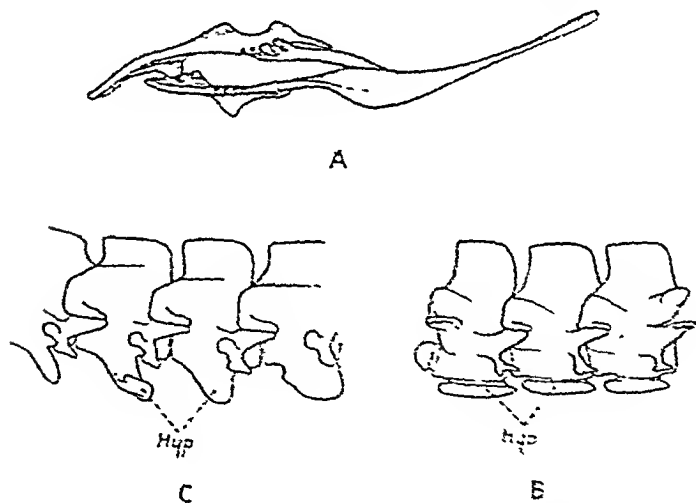


Fig. 131.—*Elachistodon westermanni*. A. Palato-maxillary arch. B. Anterior, and C. Posterior thoracic vertebræ, shewing hypapophyseal enlargements.

hyp., hypapophyses.

of *Elachistodon westermanni* from Jalpaiguri. 26 vertebræ carry enlargements, the first being opposite the 10th ventral shield. In the first 18 the enlargement is elongate and extends nearly the whole length of the vertebra; it has a rounded edge which projects through a longitudinal slit in the œsophageal

wall (fig B) . the remaining 8 are much narrower and longer and do not penetrate the membrane (fig C) In this snake, as in its relative *Dasyzelus scaber*, there is enormous development of the Harderian gland.

Nothing is known of the habits of *Elachistodon*, but presumably it is an egg eater, although not exclusively so, like *Dasyzelus* The enlarged hypapophyses serve to break the shell when the egg has been swallowed and the mouth is closed the contents are then passed on to the stomach, after which the fragments of shell are regurgitated.

Genus ELACHISTODON.

Elachistodon Reinhardt, 1863, Overs Dansk Vid Selak Forh. p 206 (type *westermanni*). Boulenger, F B I 1890, p 262, and Cat Sn Brit Mus vol. 1896, p 263

Bones of the palatamaxillary arch greatly thinned, maxilla edentulous except for two minute teeth, followed by two small grooved fangs at the posterior extremity, palatine with four minute teeth, edentulous in front and behind, mandible edentulous in front, followed by a series of minute teeth, 8 to 12 in number, head fairly distinct from neck eye large, with vertically elliptic pupil, a large pit in the posterior part of the nasal shield Body moderately elongate, feebly compressed Scales smooth, in 15 rows, the vertebral series enlarged, tail short, subcaudals paired Hypapophyses absent in the posterior part of the vertebral column

307 *Elachistodon westermanni*

INDIAN EGG EATER

Elachistodon westermanni Reinhardt, l c a p. 206, pl (Rangpur, Bengal, Copenhagen), Blanford, J Asiatic Soc Bengal, xlv, 1875 p 207, Boulenger, F B I 1890, p 263, and Cat Sn. Brit Mus vol. 1896, p 264, Wall, J Bombay N H S xii, 1913, p 400, fig. and xxix, 1923, p 878 Shaw & others, J Bengal N H S xvi 1941, p 66

Internasals as large as the prefrontals, frontal large, longer than its distance from the end of the snout, nasal large; 1 small preocular, the loreal below it touching the eye; two postoculars, 2 long anterior temporals; 6 or 7 supralabials, 3rd and 4th touching the eye, 2 pairs of genials Scales in 15 rows, 19 on the neck, the vertebral series much enlarged, hexagonal V 208-217, C 59-64 A 1.

Dark olive brown to blackish above, the vertebral scales yellowish white, except at their outer margins, forming a light vertebral stripe extending the whole length of the body.

sides spotted or flecked with the same colour ; whitish below, the outer margins of the ventrals and adjacent row of scales edged with brown ; a yellow stripe along the top of the head from the snout to the angle of the mouth, passing above the eye ; an angular bar or spot on the nape , lips yellow.

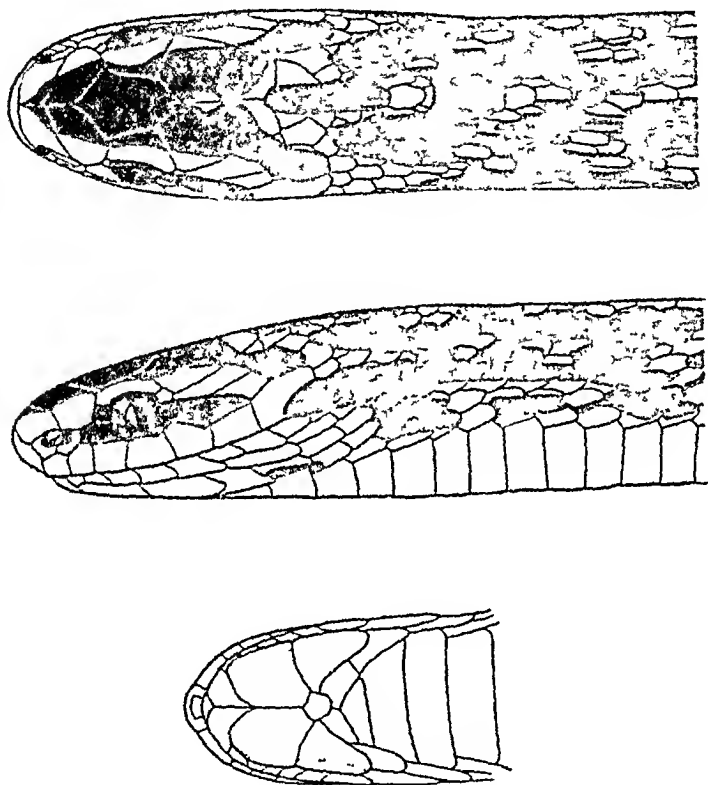


Fig 132.—*Elachistodon westermanni*

Total length : ♀ 800, tail 130 mm.

Range. Northern Bengal (near Mal Jalpaiguri district, Rungpore) ; Bihar (Purneah).

Three (five, *vide* Shaw) specimens are known.

Family ELAPIDÆ

PROTEROGLYPHA.

Elapide Boie 1827, liss p 310; Guether Rept Brit Ind 1864, p 337 — *Elopinge*, Boulenger, F R I 1890, p 382, and Cat Sn. Brit Mus iii 1896, p 310; Werner, Arch Naturg Berlin, lxxxix 1923 (8), p 161, Hoffstetter, Arch Mus. Hist Nat Lyon, xv, 1939, p 67

Characters as in the Colubridæ (p 114), except the dentition. Poison fangs attached to the anterior end of the maxillary bone, usually followed by one or more small solid teeth. Head shields normal, except for the loreal, which is always absent, pupil round in all the Asiatic genera, tail cylindrical. Isynapophyses developed throughout the vertebral column.

The *Elapide*, together with the *Hydrophidæ*, comprise the proteroglyphous group of snakes, or those which have poison fangs at the anterior end of the maxilla. In the poison fang the folding of the tooth is complete, and a channel is formed, but the union of the two folds can always be seen as a groove on the front of the tooth (see p 3). Grooving of the teeth, however, is not confined to those on the maxillary bone. In many fully grown specimens of *Naja*, *Bungarus* and *Hydrophis* examination with a good lens will show that grooves also exist on the anterior and inner aspects of other teeth as well.

The *Elapide* are found throughout the tropical and sub-tropical regions of the world. They are strongly represented in Australia, and the majority of the snakes that are found there belong to this family.

They are not found in Europe today, but fossil *Elapide*, *Palæonaja*, have been described from the Miocene and Pliocene of France (Hoffstetter, 1939).

Some 30 genera are known, three inhabit the region covered by this work. All the oriental *Elapide* are oviparous, *Naja* and *Bungarus* have parental instincts.

Key to the Genera

- 1 Maxillary bone not extending forwards beyond the palatine, scales not oblique the vertebral series strongly enlarged (except in *Hodius*)

[p 407
BUNGARUS,

- II. Maxillary bone extending forwards beyond the palatine; vertebral series of scales not enlarged (except in *N. hannah*).
- A. Scales in 13-15 rows throughout the body; scales not oblique CALLOPHIS, p. 418.
- B. Scales in 15-25 rows on the body, disposed obliquely, more on the neck, which is dilatate NAJA, p. 426.

Genus BUNGARUS.

KRAITS.

- Bungarus* Daudin, 1803, Mag. Encycl., An. 8, v, March, p. 434, based on Russell's "*Bungarum pamah*," i, 1796, p. 3, pl. iii, and Hist. Nat. Rept. v, 1803, p. 263 (type *fasciatus*); Boulenger, F.B.I. 1890, p. 387, and Cat. Sn. Brit. Mus. iii, 1896, p. 365; Wall, J. Bombay N.H.S. xviii, 1908, p. 711, and Pois. Sn. India, 1928, p. 11.
- Pseudoboa* Oppel (non Schneid., 1801), 1811, Ord. Rept. p. 68 (type *fasciatus*).
- Aspidoclonion* Wagler, 1828, Icon. Amphib. i, tab. 2 (type *semi-fasciatus*).
- Megarophis* Gray, 1849, Ann. Mag. Nat. Hist. (2) iv, p. 247 (type *formosus* = *flaviceps*).
- Xenurelaps* Günther, 1864, Rept. Brit. Ind. p. 344 (type *bungaroides*).

Maxillary bone not extending forwards beyond the palatine; poison fangs followed by from 2 to 4 small teeth. Head not distinct from neck; head shields normal, no loreal; eye moderate or small, with round pupil. Scales smooth, in 13 to 19 rows, the vertebral row strongly enlarged, except in *lividus*; tail moderate; subcaudals single or some of them paired.

Dorsal vertebræ with strong lateral expansions connected with the pre- and postzygapophyses (fig. 133, B).

Common characters, unless otherwise stated:—Nostril between two nasals; rostral broader than high; internasals shorter than the prefrontals; frontal as long as its distance from the rostral or the tip of the snout, shorter than the parietals; 1 preocular in contact with the posterior nasal; 2 postoculars; no loreal; temporals 1+2; 7 supralabials, 3rd and 4th touching the eye, 6th usually the largest; 4th infralabial largest, in contact with, or just separated from, the anterior pair of genials, which are as large as, or a little larger than, the posterior. Scales smooth, the vertebral series strongly enlarged, broader than long on the hinder part of the body. Subcaudals undivided, except in *flaviceps* and *bungaroides* in which the terminal scutes are paired. As an occasional character one or more paired scutes have been recorded of several other species.

The hemipenis extends to the 6th-9th caudal plate; the distal one-third or half is calyculate, the remainder spinose. The calyces are smallest near the tip of the organ and increase

in size as they approach the spinose area. Each cup is stiffened by spine like structures which, like the ribs of an umbrella, hold the membrane and project beyond its margin. The transition from the calyculate to the spinose area is fairly abrupt, the largest spines are those nearest the calyces, they are thick and papilla like in form, and bear a small, sharp spine at the tip. The bifurcation of the sulcus is at about the middle of the calyculate area or the junction of the calyculate and spinose areas, and the lips of the sulcus are beset with small spines throughout. I have found considerable variation within the species as regards the number and form of the spines.

Range India, Indo China; S. China, the Malayan Region and Celebes.

With the exception of *Bungarus javanicus*, all the species known are found in the area covered by this work. In their scale characters they are remarkably constant, and a description of the head shields of one will apply equally well to them all. Whether the three varieties, regarded by Boulenger in his Catalogue (1896, p. 368) as colour forms of *B. candidus*, and the other forms since described by Wall, are true species, or merely colour-varieties, remains to be shown. Each one is distinct from the others in colour pattern and occupies its own restricted geographical area.

The Kraits are remarkable for the highly polished character of their scales. Wall (1909) states that "The eye is peculiar in that the iris is not coloured, and as a result the pupil cannot be discerned in life. The organ as a whole looks like a jet bead, and in this respect the snakes of this genus are nearly unique among the Colubridæ. The Lycodons alone, as far as I am aware, share this peculiarity."

The Kraits appear to vary as little in their habits as they do in morphological characters. Of the three common species, *B. ceruleus*, *B. fasciatus* and *B. multicinctus*, much has been written, and no doubt what has been recorded of them will be found equally true for the other and rarer species. In disposition they are remarkably quiet and inoffensive, and only under great provocation can they be induced to bite. *B. fasciatus* when caught seldom endeavours to escape, but throws its body into a loose coil or two and hides its head away beneath some part of it. If provoked with a stick it will give a few convulsive jerks and then hide its head again beneath some other part of its body. Wall has recorded the same habit of *B. ceruleus* and Pope of *multicinctus*.

The Kraits inhabit more or less open country and at low altitudes, seldom ascending above 3 000 or 4 000 feet, they frequent cultivated areas and are often found in and about human habitations. Their diet consists mainly of snakes, and they will devour with equal avidity both harmless and poisonous species; small mammals, lizards, frogs, toads

and fish have also been recorded as part of their diet, but they evidently do not form the chief part of their food.

As far as we know, all the species are oviparous. *B. caeruleus* lays from 6-10, *B. fasciatus* from 8-11 eggs. They are deposited in holes in the ground, or under leaves, and are guarded afterwards by the parent. Very little is known of their breeding habits, which appear to be somewhat unusual. Wall (1924), writing of *B. ceylonicus*, makes the following comment:—"There is evidently something strange about the breeding of Kraits as a genus, for it is a very remarkable fact that out of the large series of specimens of *ceylonicus* that have passed through my hands, I never got an egg-bound female. The same remark applies to the Indian Krait (*caeruleus*), scores of which have been sent to me, and to the Banded Krait (*fasciatus*), dozens of which have been collected by and for me in Assam and Burma. . . . It would seem, therefore, the adults (*ceylonicus*) retire about September to mate, and do not dissolve their matrimonial relationship until the young are launched upon the world in March."

Compared with the Cobra and the Saw-scaled Viper, fatalities resulting from bite by the Kraits are rare.

Key to the Species.

Scales in 13 rows.

Terminal caudal scutes in pairs. *flaviceps*, p. 410.

Scales in 15 rows.

I. Terminal caudal scutes in pairs. *bungaroides*, p. 410.

II. Caudals entire throughout.

A. Vertebrae not or but feebly enlarged.

Uniform black above; C. 35-43 *lividus*, p. 418.

B. Vertebrae strongly enlarged, as broad as or broader than long.

a. Tail ending in a point; dorsal vertebrae not forming a ridge down the back.

1. Belly uniformly white; C. 37-56.

Back uniformly black above; C. 49-56. *niger*, p. 417.

Back with narrow white cross-bars arranged more or less distinctly in pairs *caeruleus*, p. 413.

Back with 27-48 white cross-bars, not arranged in pairs. *[p. 416.]*
multicinctus,

Back with 20-25 broad white cross-bars, the median part of each bar spotted with black *candidus*, p. 416.

Back with 11-14 very broad, white, black-spotted cross-bars *[p. 417.]*
magnimaculatus,

2. Belly with black marks or cross-bars, sometimes absent in the juvenile; C. 32-42 *ceylonicus*, p. 415.

b. Tail ending obtusely; dorsal vertebrae forming a ridge down the back.

Alternately marked with black and yellow annuli *fasciatus*, p. 411.

Scales in 17-19 rows.

- Back with narrow white cross bars, arranged more or less distinctly in pairs; a series of white vertebral spots, at least anteriorly *caruleus*, p 413
- Back with narrow white cross bars or transverse series of small spots not arranged in pairs; no vertebral spots *walli*, p 418

308 *Bungarus bungaroides*.

Flaps bungaroides Cantor, 1839, P Z S p 33 (Cherra Pung, Khasi Hills, London: col sketch in Bodleian Library, no 61—*Yenurelaps bungaroides*, Günther, Rept Brit. Ind 1864, p 345; Jerdon P. A. S. Bengal, 1870, p 82, Manford, J. A. S. Bengal, xlvij 1879 p 131—*Bungarus bungaroides* Boulenger, F. H. L. 1890 p 382 and Cat. Sn. Brit. Mus. iii, 1896, p 370; Schlater, J. A. S. Bengal, ix, 1891, p 246; Wall, J., Bombay N. H. S. xix, 1909, p 355, and xxx, 1924 p 24 and Poiss. Sn. Ind 1928, p 13; Smith, Rec. Ind. Mus. xlii, 1940, p 444 Shaw & others, J. Bengal, N. H. S. xvi, 1942, p 120

Scales in 15 rows throughout V. 220-237, C. 44-51, all paired, or a few of the anterior acutes single.

Black or very dark brown, with white or pale yellowish transverse lines, or narrow bars, formed of a series of spots across the back, those anterior are angular and point forwards, below the lines widen, forming broad bands across the belly; a white line across the snout, and a curved one on each side from the frontal shield to behind the angle of the mouth; a third from the postoculars to the hp. In the adult the head markings are sometimes very indistinct.

Total length ♂ 1400, tail 160; ♀ 1000, tail 130 mm

Range Eastern Himalayas (Darjeeling district; Sikkim), Assam (Khasi Hills), Cachar, Upper Burma (Matsatap and Ahke, N. E. of Fort Hertz)

A rare snake

309. *Bungarus flaviceps*.

YELLOW HEADED KRAIT

Bungarus flaviceps Reinhardt, 1843, Vitenak Selak, Skript x, p 267, pl. iii, fig 4 (Java); Cantor, Cat. Malay Rept. 1847, p 112; Wall J. Bombay N. H. S. xxx, 1924, p 21, Boulenger, Rept. Malay Pen. 1912, p 200, De Rooij, Rept. Indo Aust. Archipel ii, 1917, p 245; Smith Bull. Raffles Mus. no 3, 1930, p 67, Cochran, Proc. U.S. Nat. Mus. lxxvii, 1930 p 36—*Viperopsis flaviceps*, Trant, Rept. Cochinchina, 1885, p 33. Schlater J. A. S. Bengal, ix, 1891, p 245, and List Sn. Ind. Mus. 1891, p 57, Bourret, Serp. Indochine, 1936, p 392.

Scales in 13 rows throughout, a distinct ridge down the back and tail formed by the spinous processes of the vertebral ones single V ♂ 220-236, ♀ 193-217; C ♂ 47-53, ♀ 42-54, the anterior

The hemipenis differs from the typical organ (p. 407) in that the lips of the sulcus within the spinose area are quite smooth.

Black above, with an orange-yellow vertebral stripe which may be partly or completely absent; interstitial skin orange-yellow, and this colour may extend on to the scales so as to form longitudinal stripes, particularly on scale-rows 1 and 2; these stripes always distinct in the young. The black colour of the back terminates in a point on the nape, the rest of the neck and the whole of the head being orange-yellow; tail, and usually also the posterior part of the body, orange or yellow; lower parts orange or yellow, uniform or with the shields edged with brown.

Total length: ♂ 1850. tail 220 mm.

Range. Siam (Ratburi district); Cochin China; Tenasserim (Mergui); the Malay Peninsula and Archipelago. Tirant (1885) records two examples from Nui Dinh (Baria), Cochin China, and there does not seem any reason to doubt his identification. It has not been obtained since in French Indo-China.

310. *Bungarus fasciatus*.

BANDED KRAIT.

Seba, Thes. ii, 1735, pl. lviii, fig. 2; Russell, Ind. Serp. i, 1796, p. 3, pl. iii (Bengal).

Pseudoboa fasciata Schneider, 1801, Hist. Amph. ii, p. 283 (based on Russell's desc. and fig.—*Bungarus fasciatus*, Daudin, Hist. Nat. Rept. v, 1803, p. 263; Fayrer, Thanatoph. Ind. 1874, p. 10, pl. ix; Boulenger, F. B. I. 1890, p. 388, and Cat. Sn. Brit. Mus. iii, 1896, p. 366, and Rept. Malay Pen. 1912, p. 198; Primrose, J. Bombay N. H. S. xii, p. 589; Wall & Evans, ibid. xiii, 1900, p. 344; Wall, ibid. xix, 1909, p. 835, and xx, 1911, p. 933, col. pl., and xxx, 1924, p. 22, and Pois. Sn. Ind. 1928, p. 14; Evans, J. Bombay N. H. S. xvi, 1905, p. 519; O. A. Smith, ibid. xxi, 1911, p. 283; Kinnear, ibid. xxii, 1913, p. 635; Martin, ibid. same page; M. A. Smith, J. Nat. Hist. Soc. Siam, i, 1915, p. 177, photo; De Rooij, Rept. Indo-Aust. Archipel. 1917, p. 243; Masson, J. Bombay N. H. S. xxxiv, 1930, p. 256; Pope, Rept. China, 1935, p. 332, pl. 15; Bourret, Serp. Indochine, ii, 1936, p. 385. Shaw & others, J. Bengal N. H. S. xvi, 1942, p. 116.

Bungarus annularis Daudin, 1803, Hist. Nat. Rept. v, p. 265, pl. v (based on Russell's pl.).

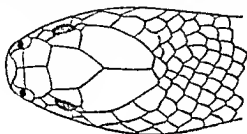
Bungarus fasciatus insularis Mell, 1930, Sitz. Ges. nat. Fr. Berlin, p. 325 (Insellindien).

Bungarus fasciatus bifasciatus Mell, 1930, Sitz. Ges. nat. Fr. Berlin, p. 325 (Yao-shan, Kwangsi Prov., China).

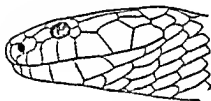
Scales in 15 rows throughout. A prominent ridge down the back and tail formed by the spinous processes of the vertebrae; tail ending bluntly, usually more or less swollen at the tip. V. 200-234; C. 23-39.

Alternately banded with black or purplish-black, and yellow or buff, the black bands being as broad as their interspaces or

a little broader, a large black mark on the nape continued in a point on the head to between the eyes, and bordered on each side by yellow, the rest of the top of head brown with yellow mottlings, sometimes the yellow bands have a median stippling of black; sometimes the black bands are not complete below, in specimens from the Malay Peninsula the yellow bands are very pale, sometimes almost white. Length specimens over 1800 mm in length are rare. One



A



B

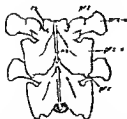


Fig 133 —A. Dorsal and lateral views of head of *Bungarus caeruleus* (B.M. 93 I 14 11) B Dorsal and hind views of vertebra of *B. fasciatus*

hyp. hypapophysis, ns., neural spine, pr., presygapophysis, pr.-e., presygapophyseal expansion, pz., postsygapophysis, pz.-e., postsygapophyseal expansion, sq., sygantrum, ss., xygoapophysis; sb. faceta for ribs

recorded by me from Siam measured 2020 mm. in total length, tail 150 mm.; O. A. Smith (1911) records one 7 feet long (2125 mm.).

Range. The whole of the Indo-Chinese subregion; the Malay Peninsula and Archipelago; Southern China. In the Indian Peninsula it is confined to the north-east; Kinnear (1913) records it from as far south as Hyderabad, and Stone (1922) from Oudh in the United Provinces. Wall (1930) records it from the Godavari and Mahanadi Valley, Bihar and Orissa.

The Banded Krait is not uncommon in the Indo-Chinese subregion, frequenting the plains and open country, often in the vicinity of human habitations. It has been obtained in Burma at an altitude of 5,000 feet.

The marked vertebral ridge of this snake has earned for it in Siam the name of "ngu sam liem," the triangular snake.

Col. Evans (1905) records the brooding habits of this snake. The eggs measured 2.5×1.5 mm. in size, and the hatchlings 320-340 mm. in length.

Wall (1909) records that a bullock bitten by a Banded Krait died "about 20 minutes or so later." On the other hand (1911) he states that the toxicity of the venom by direct experiment has been estimated to be 7 to 14 times less than that of cobra venom, and that most of the Burmese affirm that the Banded Krait is not poisonous. There are no authentic records of human beings having been bitten.

311. *Bungarus cæruleus*.

COMMON INDIAN KRAIT.

Russell, Ind. Serp. i, p. 2, pl. i (Vizagapatam).

Pseudoboa cærulea Schneider, 1801, Hist. Amphib. ii, p. 284 (based on Russell).—*Bungarus cæruleus*, Boulenger, F. B. I. 1890, p. 388 (in part), and Cat. Sn. Brit. Mus. iii, 1896, p. 368; Fayrer, Thanotoph. Ind. 1874, p. 11, pl. x; Cholmondeley, J. Bombay N. H. S. xviii, 1908, p. 921; Pitman, *ibid.* xxvi, 1919, p. 636; Prater, *ibid.* xxvi, 1919, p. 684; O. A. Smith, *ibid.* xxi, p. 283; Wall, *ibid.* xviii, 1907, pp. 101 and 716, col. pl. viii, figs. 1, 2, 3, 5, and xxii, 1913, pp. 19, 401, maps, and xxii, 1914, p. 808, and xxvi, 1919, p. 575, and Pois. Sn. Ind. 1928, p. 11, and Sn. Ceylon, 1921, p. 437; Ingoldby, J. Bombay N. H. S. xxix, 1923, p. 130; Schmidt, Pub. Field Mus. N. H. (Zool.) xii, 1926, p. 172; Murphy, J. Bombay N. H. S. xxxiii, 1929, p. 722; Fraser, *ibid.* xxxix, 1937, p. 486.

Boa lineata Shaw, 1802, Gen. Zool. iii, p. 356 (based on Russell).

Bungarus arcuatus Dum. & Bib. 1854, Erp. Gén. vii, p. 1272 (India: Paris).

Bungarus sindanus Boulenger, 1897, J. Bombay N. H. S. xi, p. 73, pl. (Sind: London); Pitman, *ibid.* xxii, 1913, p. 636; Wall, *ibid.* xvii, p. 68, and xviii, 1908, p. 716, and xx, 1911, p. 1041, and xxii, 1913, pp. 402 and 808; Ingoldby, *ibid.* xxix, 1923, p. 130.

Bungarus candidus, Wall, 1907, J. Bombay N. H. S. xviii, p. 122, and xxx, 1924, p. 22 (in part); Prater, *ibid.* xxx, 1924, p. 174.

Bungarus candidus cæruleus, Bourret, 1936, Serp. Indochine, p. 389.

Scales in 15 or 17 rows. V. 194-234; C. 42-52.

Black or bluish black above with narrow white cross-bars, usually arranged more or less distinctly in pairs they are least distinct on the anterior part of the body and may be entirely absent there. In the young the bands are complete in old individuals they are composed of a series of connected spots usually a particularly large spot being on the vertebral region on the sides of the body the bars may or may not widen a white preocular spot usually present upper lip and lower parts white.

Two forms of colour pattern can be distinguished —

I The transverse bars are narrow and do not or do not greatly widen on the sides of the body there are no vertebral spots.

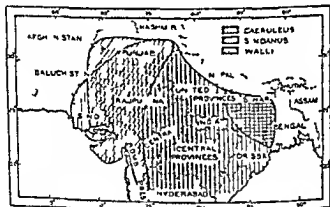


Fig. 134.—Map showing distribution of *Bungarus caruleus* (S India not included) *B. sindanus* and *B. walli*.

II The transverse bars are always distinct and widen on the sides of the body a vertebral spot is always present. All the specimens of *sindanus* that I have seen show this form.

Variation A specimen from Sholapur Bombay Presidency (17 scale rows) has no cross-bars but has a series of white vertebral spots only. Another from Yeravala Poona dist (15 scale rows) is uniform dark brown in colour above except for a thin white line extending along scale rows 2 and 3 for the greater part of the body.

Wall has shown that *B. sindanus* is not specifically distinct from *B. caruleus*. The former with 17 scale rows at mud body occurs chiefly in the desert regions of Sind and Rajputana where it is said to be common but not to the exclusion of the

typical form. The range of the two forms is shown in the accompanying map.

Six specimens from the Andaman Islands have the following characters:—Scales in 15 rows throughout. V. 192-200; C. 40-46. Black above, with narrow white equidistant cross-bars, 40-46 in number, on the body; these are equally distinct throughout the body, and have no vertebral spots. All the specimens are juvenile or half-grown.

Total length: 1200, tail 150 mm. Specimens up to 5 feet in length have been recorded, but they are rare. In the northern parts of India it grows larger than in the south.

According to Wall the male grows to a larger size than the female.

Eggs are laid in April and May, and the young emerge during May, June and July. At birth they measure 260-280 mm. in length; they grow nearly a foot in the first year of life, and another foot or more in the second and third (Wall).

Range. India, as shown in the map; Ceylon. Common in many parts of India.

Wall (1928) writes: "Though essentially a snake of the plains, I have obtained it in Almora at an altitude of 5,400 feet, and have other records exceeding 5,000 feet. It is very rare in Ceylon. It is the only Krait found in Peninsular India south of the Ganges Basin."

312. *Bungarus ceylonicus*

CEYLON KRAIT; KARAWALA.

Bungarus ceylonicus Günther, 1864, Rept. Brit. Ind. p. 344 (Ceylon; London); Boulenger, F. B. I. 1890, p. 388, and Cat. Sn. Brit. Mus. iii, 1896, p. 367; Green, Spol. Zeyl. 1905, p. 158; Wall, *ibid.* vii, 1911, p. 157, and Sn. Ceylon, 1921, p. 451, figs., and Spol. Zeyl. xi, 1921, p. 402, and *ibid.* xiii, 1924, p. 86, and J. Bombay N. H. S. xxx, 1924, p. 22, and Poiss. Sn. India, 1928, p. 17.

Scales in 15 rows throughout. V. 219-236; C. 32-42.

Black above, with from 15-21 white cross-bars which are narrow on the vertebral line and widen on the sides of the body; in the young they are well defined, but in the adult are broken up into spots and often indistinct; lower parts uniform white in the juvenile, alternately black and white in the adult. Hinder part of head white in the young.

Total length: 1000; tail 95 mm.

The young when born measure 230-260 mm. in length.

Range. Peculiar to Ceylon, where it is common. Found generally in hilly districts but at no great altitude, seldom ascending above 3,000 feet.

313 *Bungarus multicinctus*

MANY BANDEN KRAIT

- Bungarus multicinctus* Blyth 1861, J. A. S. Bengal, xxix, p. 28 (Amoy type lost). Wall, Poir. Sn. Ind. 1823, p. 11, and J. Bombay N. H. S. xviii, 1808, p. 715, col. pl. viii, fig. 4 and xxx 1824 p. 23, Symna, ibid. xlii, 1840, p. 129—*Bungarus multicinctus multicinctus*, Pope, Rept. China, 1915, p. 335.
Bungarus caruleus Stoliczka 1870, J. A. S. Bengal, xxxix, p. 209, Boulenger F. B. I. 1890 p. 359 and Cat. Sn. Brit. Mus. iii, 1896, p. 363.
Bungarus candidus multicinctus Dourret, 1915, Serp. Indochina, p. 390.

Scales in 15 rows throughout V. 209-228; C 44-54, for specimens from the Indo-Chinese region.

Black or bluish black above, with from 27-48 white cross-bars on the body, and 7-13 on the tail, they usually expand laterally, and on the fore-part of the body are farther apart from one another than on the hinder part, the median portion of each bar may be spotted with black. Head dark brown or black above, upper lip and lower parts white, tail below mottled and marked with dark brown.

Variation. A juvenile (Brit. Mus. Coll.), said to have come from the Manson Mts, Tong King, has 24 comparatively broad white cross-bars on the body and 6 on the tail; the whole of the head, except the snout, is white. Another example, in Paris, from Upper Laos, has the temporal regions white.

Total length 1100, tail 145 mm.

Range. Burma (Fort Hertz, Myaungina, Maymyo, Toungoo, Rangoon, Pegu), Hainan, Hong Kong and S. China, Formosa.

314 *Bungarus candidus*

MALAYAN KRAIT

- Seba, Thes., 1735, ii, pl. lxxvi, fig. 4.
Coleber candidus Linn. Mus. Adolph. Frid. 1754, p. 33, pl. vii, fig. 1 and Syst. Nat. 10th ed. 1758, p. 223 (India).—*Bungarus candidus* Boulenger, Cat. Sn. Brit. Mus. iii, 1896, p. 368 (in part); Wall J. Bombay N. H. S. xviii, 1808, p. 715, pl. viii, fig. 7, and Poir. Sn. Ind. 1823, p. 12, Boulenger, Rept. Malay Pen. 1912, p. 190, de Rooij, Rept. Indo-Austral. Archipel ii, p. 244; Smith J. Nat. Hist. Soc. Siam, vi, 1923, p. 61.
Bungarus semifasciatus Bosc., 1827, Ias. p. 652 (Java).
Bungarus caruleus Boulenger, 1890, F. B. I. p. 355.

Scales in 15 rows throughout V. 209-219, C 40-50, for specimens from the mainland of Asia.

Black or bluish black above, with from 20-25 broad white cross-bars on the body, and 7-10 on the tail; on the fore part of the body the bars are narrower than their interspaces, on the hinder part of the body they are of about the same width.

the median portion of each white bar is spotted or speckled with black. Head black above, the nape sometimes with a light indistinct A-shaped mark; upper lip and lower parts white; tail spotted with dark brown below.

Total length: 1070, tail 135 mm.

Range. S. E. Siam; Annam: the Malay Peninsula; Sumatra, Java, Celebes.

I know of 4 specimens from the Indo-Chinese region (Sriracha, S.E. Siam; Koh Kut, an island in the gulf nearby; Thua Lun, S. of Hué, Annam; and one in the Natural History Museum, Paris, labelled Annam).

315. *Bungarus magnimaculatus*.

Bungarus caeruleus, Wall & Evans, J. Bombay N. H. S. xiii, 1900, p. 343.

Bungarus caeruleus var. *magnimaculatus* Wall & Evans, 1901, J. Bombay N. H. S. xiii, p. 611 (Meiktila, Upper Burma: London).

Bungarus magnimaculatus, Wall, *ibid.* xviii, 1908, p. 715, and xxx, 1924, p. 23, and 1925, p. 820, and *Rec. Ind. Mus.* 1909, p. 147, fig., and *Pois. Sn. Ind.* 1928, pp. 11, 16.

Scales in 15 rows throughout. V. 214-235; C. 40-48.

Black or bluish-black above, with 11-14 very broad, light cross-bars which are as broad as, or broader than, their interspaces; the light bars are composed of an almost equal mixture of black and white, the black being confined to the central portions of the scales, the white to the margins except those of the vertebral series, in which the colours are reversed; a white preocular spot more or less distinct; lower parts white.

Total length: 1300; tail 150 mm.

Range. Burma (Meiktila, Monywa, Hmawbi, Myingyan, Shwebo, Minbu, Pyawbwe).

316. *Bungarus niger*.

BLACK KRAFF.

Bungarus niger Wall, 1908, J. Bombay N. H. S. xviii, p. 715 (Tindharia, E. Himalayas; London), and xix, 1909, pp. 355 and 838, pl. —, figs. 4-7. and xxx, 1924, p. 23, and *Pois. Sn. Ind.* 1928, p. 17; Shaw & others, J. Bengal N. H. S. xvi, 1942, p. 119.

Scales in 15 rows throughout. V. 216-231; C. 49-56.

Uniform black or bluish-black above, white below, with a more or less distinct dark mottling at the bases of the ventral and subcaudal shields.

Total length: 1200, tail 135 mm.

Range. E. Himalayas (Darjeeling district); Assam (Dibrugarh, Sadiya, Sibsagar and Garo Hills).

317 *Bungarus lividus*

LESSER BLACK KRAIT

Bungarus lividus Cantor 1839 P Z S p 32 (Assam col sketch n Bodle an L brary no 1) Boulenger F B I 1890 p 380 and Cat Sn Br t Mus 1: 1896 p 370; Selater J A S Bengal, ix 1891 p 248 Wall, J Bombay N H S xviii 1908 p 714 and x x 1909 pp 335 and 838 pl —, fig 8 and xxi 1911 p 281 and xxx 19 4 p 23 Shaw & others, J Bengal N H S xvi 194 p 118

Scales in 15 rows throughout the vertebral series not or but feebly enlarged not broader than long in the middle of the body shaped like the adjacent scales V 200-221 C 35-43

Colour as in *niger*

Total length ♂ 1070 tail 120 mm

Range Bengal (Rungpore Jalpa guri and Darjeeling districts) Assam (Dibrugarh)

As there has been confusion between this and the preceding species the records of localities given here are only for those specimens that I have examined

318 *Bungarus walli*

WALL'S KRAIT

Bungarus walli Wall 1907 J Bombay N H S xvi p 608 pl. — (Fyzabad U I Lon lon) and xviii 1907 p 1 —, and xix 1908 p 263 and xxx 1924 p 24 and Pous Sn. Ind 1928 p 20 Cholmondeley J Bombay N H S xviii 1908 p 921
Bungarus evindanus Annandale, 1905 J A S Bengal, p 213
Bungarus ceruleus R. mull 1931 J Bombay N H S xxiv p 1083

Scales in 21 or 19 19 or 17 17 rows V 196-208 C 50-55 Blush black above with narrow white transverse bars 65-80 in number formed by series of small spots upper lip and lower parts white tail below suffused with brown no light preocular spot

Total length ♂ 1640 tail 190 ♀ 1500 tail 100 mm

Range UP (Fyzabad) Bengal (M dnapore) Bihar & Orissa (Purnea Gaya file Wall)

Genus CALLOPHIS

CORAL SNAKES

Calliophis Gray 1834 Ill Ind. Zool : pl lxxxv fig 1 (type *gracilis*) — *Calliophis* Günther P Z S 1859 p 79; Boulenger F B I 1890 p 383 and Cat Sn Br t Mus 1896 p 396
Brachyrhynchus P t z nger (not of Laporte 1832) 1843 Syst Rept p 28 (type *l. lips calligaster* Waggoner n)
Hemibatrachus Peters 1862 Mon Akad Berlin p 637 (type *calligaster*) Boulenger Cat Sn Br t Mus 1896 p 394 Stejneger Herpet Japan, 1907 p 387

Maxillary bone extending forwards beyond the palatine

poison fangs followed after an interval by from 0-5 small teeth. Head not distinct from neck; head shields normal, no loreal; nostril between two nasals; pupil round. Body cylindrical, elongate, of almost equal diameter throughout. Scales smooth, subequal, in 13 or 15 rows throughout. Tail short, subcaudals paired, sometimes unpaired in *maccllelandi*.

Closely related to *Bungarus*, from which it is probably derived.

Range. India; Indo-China; China; Japan; the Philippine Islands; 12 or 13 species are recognized.

Callophis has been separated from *Hemibungarus* on the presence or absence of teeth on the maxillary bone behind the poison fangs. A critical examination of the species of *Callophis*, said to have none, however, shows that all of them, except *gracilis* and *maccllelandi*, possess teeth. I therefore unite the two genera.

Very little is known of the habits of the Indian Coral Snakes. They are of timid disposition and nocturnal in their movements, often found by day half buried in the earth beneath fallen timber, or among leaves. Their main food appears to be snakes.

Elaps malabaricus Jerdon, J. A. S. Bengal, xxii, 1853, p. 522, is not recognizable from the description. It has been referred, with doubt, to *Callophis*.

Wall, in his 'Poisonous Snakes of India,' ed. iv, p. 22, includes the closely allied genus *Doliophis* (the *Adeniophis* of Boulenger, F. B. I. p. 386) in the Indian fauna. I do not know of any authentic records of the occurrence of this Malayan genus, now known as *Maticora*, within the area covered by this work.

Key to the Species.

Scales in 13 rows.

I. 1 pre- and 2 postoculars.

A. 6 supralabials *melanurus*, p. 420.

B. 7 supralabials.

a. One very long temporal shield in contact with 3 labials.

1. Preocular touching nasal.

V. 174-203; C. 21-31..... *maculiceps*, p. 420

V. 285; C. 27..... *hughi*, p. 421.

V. 234-251; C. 32-44..... *nigrescens*, p. 422.

2. Preocular separated from nasal.

V. 212-221; C. 33-34..... *beddomei*, p. 423.

b. Temporals 1+1, the anterior shield in contact with 2 labials..... [p. 423.

maccllelandi,
II. No preocular; 1 postocular..... *bibroni*, p. 425.

Scales in 15 rows.

V. 184; C. 31..... *kelloggi*, p. 426.

319 *Callophis melanurus*

SLENDER CORAL SNAKE

Russell, *Ind Serp* 1, 1796, p 12 pl viii (Nerva, Bengal; London).
Coluber melanurus Shaw, 1802, *Gen. Zool* iii, p 652 (based on Russell's pl.)

Pipera trimaculata Daudin, 1803, *Hist Nat Rept* vi, p 25 (based on Russell) — *Callophis trimaculatus*, Günther, P. Z. S. 1859, p 83, pl. xvi, fig. E, and *Rept Brit Ind* 1864, p 350; Phipson, *J Bombay N H Soc* ii, 1887, p 248, Boulenger, P. B. I. 1890, p 384, and *Cat Sn Brit Mus* iii, 1896 p 397, D. Abreu, *Sn. Nagpur* 1916, p 36 and *J Bombay N H S* xxii, 1912, p. 634, Wall, *Sn. Ceylon*, 1921 p. 497, and *Pois. Sn. Ind.* 1928, p 33 fig head, and *J Bombay N H S* xxx, 1925, p 244, Willey, *Spol Zeyl* 1903, p 84, and 1908, p 186, Fraser, *J Bombay N H S* xxxix, 1937, p 400, Prater, *ibid* xxx, 1924 p 175

Two or three minute teeth behind the poison fangs, eyes small, its diameter equal to or less than its distance from the mouth, 1 preocular, in contact with the nasal, 2 postoculars; temporals 1+1, 6 supralabials, 3rd and 4th touching the eye, 5th and 6th in contact with the temporal, 2 pairs of genuals, 3 sometimes 4, infralabials, touching the anterior pair, scales in 13 rows V 249-277; C ♂ 33-37, ♀ 24-27 (India), V 229-257, C 27-37 (Ceylon), A 2

Light brown above, the centre of each scale speckled with brown thus forming a series of longitudinal lines down the whole length of the body, head and neck black above with yellow spots, a pair on the occiput usually distinct, tail with 2 black rings, one at the base, the other near the tip, yellowish below (red in life)

Total length ♂ 335, tail 22 mm

Range Bombay and Dharwar districts, Malabar, Coimbatore, Anaimalais, Bengal (Nerva), C P (Nagpur), Ceylon (Trincomalee, Matale, Tissamaharama, Balangoda) A rare snake Found in the plains and in the hills at low altitudes

When disturbed, this snake will curl its tail over its back so as to expose the red of the under surface

The specimen which Russell described and figured in his 'Indian serpents' is still in an excellent state of preservation (Brit Mus Coll.)

320. *Callophis maculiceps*.

SMALL-SPOTTED CORAL SNAKE

Elops melanurus (not of Shaw) Cantor, 1847, *J A S Bengal*, xvi, p 1027, pl. xl, fig 6

Elops maculiceps Günther, 1858, *Cat Sn Brit Mus* p 232 (E. Indies; London) — *Callophis maculiceps*, Günther, P. Z. S. 1859, p 84, pl. xvi, fig. D, and *Rept Brit Ind* 1864, p 351, Boulenger, P. B. I. 1890, p 384 and *Cat Sn. Brit Mus* iii, 1896 p 397, and *Fauna Malay Pen* 1912, p 204, Wall & Evans, *J Bombay N H S* xii, 1900, p 344, Wall, *ibid*, xxx, 1925, p 244, and *Pois Sn. Ind* 1928, p 34, fig head, Oykdenatolpe, *Kungl Svva. Vet Akad Stockholm*, iv, 1916 (3) p 26, Cochran, *Proc U.S*

Nat. Mus. lxxvii, 1930, Art. ii, pp. 37; Bourret, Serp. Indo-chine, 1936, p. 403.

Elaps atrofrenalis Sauvage, 1877, Bull. Soc. Phil. Paris, (7) i, p. 111 (Cochin-China; Paris).

Callophis maculiceps var. *univirgatus* Smith, 1915, J. Bombay N. H. S. xxiii, p. 786 (Nong Kai Ploi, C. Siam; London).

Callophis maculiceps punctulatus Bourrett, 1934, Bull. Gen. Instr. Pub. Hanoi, vi, p. 10 (Cambodia; Paris), and Serp. Indo-chine, 1936, p. 405.

One to three minute teeth behind the poison fangs; eye small, its diameter equal to or less than its distance from the mouth; 1 preocular in contact with the nasal, 2 postoculars; a single very long temporal shield; 7 supralabials, 3rd and 4th touching the eye, 5th, 6th and 7th touching the temporal; 4 or 5 infralabials in contact with the anterior pair of genials, which are equal to, or a little longer than, the posterior pair. Scales in 13 rows. V. ♂ 174-186, ♀ 189-203; C. ♂ 25-31, ♀ 21-25; A. 2.

Hemipenis extending to the 10th caudal plate: sulcus not divided; the tip of the organ has a number of small longitudinal folds, the middle and proximal part have three much larger ones; there are no calyces or spines.

Two colour forms can be defined:—

I. Light brown, reddish or greyish-brown above, with small, distant, sometimes irregular black spots longitudinally arranged along each side of the back, top of head and nape black, the colour interrupted by yellow markings which are variable in size and shape; usually a yellow spot on each side of the occiput; upper lip behind the eye yellow; tail with two black rings, one at the base and the other near the tip; yellowish below (red in life); tail below pale blue or grey.

II. Similar to I, but with a black vertebral stripe and no black spots on the body (*univirgatus*).

Total length: ♂ 435, tail 50; ♀ 480, tail 33 mm.

Range. Burma and Siam as far north as lat. 20° and south to the Malay Peninsula; Cambodia, Cochin-China.

Form II is known only from Central and S.E. Siam.

A specimen obtained by me in Siam had just eaten a *Typhlops*.

321. *Callophis hughii*.

Callophis hughii Cochran, 1927, Proc. Biol. Soc. Washington, xl, p. 190 (Koh* Tao, Gulf of Siam; Washington), and Proc. U.S. Nat. Mus. lxxvii, 1930, Art. ii, p. 37, fig. head.

Differs from *C. maculiceps* in having more ventrals, 285, and in the uniform coloration of the back.

Colour in life "reddish-brown, lighter on the belly; underside of tail light blue." Not seen by me. Perhaps an island race of *maculiceps*.

* Koh=Island.

322 *Callophis nigrescens*

- Callophis nigrescens* Günther 1860 Ann Mag Nat Hist (3) ix p 131 and Rept Brit Ind. 1864 p 351 pl xxv fig F (India, London) Theobald Cat Rept Brit Ind. 1876 p 213. *Phrynosoma* J Bombay N H S h 1857 p 249. Boulenger F B I 1899 p 384. Ferguson, J Bombay N H S x, 1895 p 74.—*Hemibungarus nigrescens* Boulenger Cat Sn. Brit Mus iii, 1896 p 394. Wall J Bombay N H S xxvi 1919 p 576 and Fou Sn. Ind. 1928 p 35 fig head.
- Callophis nigrescens* var *khandallensis* Wall, 1913 J Bombay N H S xx i p 638 (Khandalla).
- Callophis concinnus* Boulenger 1863 Madras Quart J Med Sci. vi p 45 fig head (red wurtum, Nilgiris London) and J Soc B b Nat Hist i 1860 p. 310 (reprint).
- Callophis pentalineatus* Boulenger 1871 Madras Month J Med. Sci. iv p 401 (Pinnad Travancore Hills London) and J Soc. B b Nat Hist i, 1940 p 374 (reprint).

Three or four teeth behind the poison fangs. Eyes small its diameter less than its distance from the mouth. One preocular in contact with the nasal. 2 postoculars. a single very long temporal. 7 supralabials. 3rd and 4th touching the eye. 5th 6th and 7th touching the temporal. 2 pairs of subequal genials. 4 infralabials touching the anterior pair. Scales in 13 rows. V 23-25. C ♂ 35-44 ♀ 32-36. A usually divided.

Hemipenis short extending to the 6th caudal plate spines throughout the spines being closely set and of almost equal size except at the extreme tip where they are smaller. Starting from the base and extending a good way up the organ on either side of the sulcus are two longitudinal folds.

Three colour forms can be defined they are connected to one another by every gradation —

I Pale reddish or brownish above with 5 black stripes on the body a vertebral and two lateral pairs and 3 on the tail the outermost stripes being on scale-rows 1 and 2 top of head black with light regular markings a broad black bar on the nape yellowish below (red in life) upper lip with black vertical marks (*pentalineatus*) Nilgiri Anaimalai and Travancore Hills.

II Light or dark purplish brown above, with 5 black stripes edged with white the white lines being continuous or regularly broken the brown of the dorsum extends on to the lateral edges of the ventrals head markings as in I. Anaimalai Nilgiri and Shevaroy Hills.

III Blackish or greenish blue above with 3 or 5 black stripes not edged with white. The ground colour may be so dark that the black stripes are obscured (*khandallensis*) when only 3 striped the outer pair are absent. Head markings as in I but usually less distinct (*concinnus*) The Western Ghats as far north as Panchgani.

Total length : ♂ 1140, tail 130 mm.

The most elongate of all the Indian species. Beddome writes that it "grows to 3 feet long with a circumference of not more than a man's little finger." Wall states that it feeds entirely on other snakes, and is found only in the hills at between 3,000 and 7,000 feet altitude.

323. *Callophis beddomi*, sp. nov.

Hemibungarus nigrescens, Boulenger, 1890, F. B. I. p. 384, and Cat. Sn. Brit. Mus. iii, 1896, p. 394, var. A (Shevaroy Hills, S. India; London).

Differs from *nigrescens* as follows:—Prefrontal in contact with the 3rd labial, separating the preocular from the nasal; fewer ventrals and subcaudals; V. 212-221; C. 33-34; and in the colour pattern, which is entirely different.

Light purplish-brown above, with irregularly-shaped, black, white-edged spots. These are more or less regularly arranged in two vertebral series, separated from one another by a black vertebral line, or confluent with one another; two lateral series of spots and intermediate ones of much smaller size; whitish below.

Two specimens are known, both females. The type was collected by Col. Beddome in the Shevaroy Hills; the paratype is from Koppa, Mysore, and is in the Indian Museum, no. 13559.

Total length : 565, tail 65 mm.

324. *Callophis maclellandi*.

MACCLELLAND'S CORAL SNAKE.

Elaps maclellandii Reinhardt, 1844, Calcutta J. Nat. Hist. iv, p. 532 (Assam).—*Callophis maclellandii*, Günther, P.Z.S. 1861, p. 219, and Rept. Brit. Ind. 1864, p. 349; Boulenger, F. B. I. 1890, p. 385, and Ann. Mus. Civ. Genova, (2) xiii, 1893, p. 327, and Cat. Sn. Brit. Mus. iii, 1896, p. 398; Acton & Knowles, Ind. J. Med. Res. ii, 1914, p. 56; Annandale, Rec. Ind. Mus. viii, 1912, p. 50; Schlater, List Sn. Ind. Mus. 1891, p. 56; Venning, J. Bombay N. H. S. xx, 1910, pp. 342; Wall & Evans, *ibid.* xiii, 1901, p. 612; Wall, *ibid.* xviii, 1908, pp. 333 and 780, and xix, 1909, p. 356, and xxii, 1913, p. 639, and xxv, 1918, p. 628, col. pl., and xxxi, 1926, p. 566, and Pois. Sn. Ind. 1928, p. 31, fig.; Pope, Rept. China, 1935, p. 341, pl. xvi; Bourret, Serp. Indochine, 1936, p. 406, fig. head.

Elaps personatus Blyth, 1855, J. A. S. Bengal, xxiii, p. 298 (Assam).

Elaps univirgatus Günther, 1858, Cat. Sn. Brit. Mus. p. 231 (Nepal; London).—*Callophis univirgata*, Günther, P.Z.S. 1859, p. 83, pl. xvii.

Callophis annularis Günther, 1864, Rept. Brit. Ind. p. 350, pl. xxiv, fig. 1 (India; London).

Callophis maclellandi var. *nigriventer* Wall, 1909, J. Bombay N. H. S. xix, p. 268 (Kasauli, W. Himalayas; London).

Callophis maclellandi var *gorei* Wall, 1910 J Bombay N H S
xx p 842 (Ja pur Assam) and xxi 1913 p 639 and xix,
1923 p 468

Callophis maclellandi var *concolor* Wall 1905 J Bombay N H S,
xxx p 800 (H ton Kach n Hills London)

No teeth behind the poison fangs. Diameter of the eye less than its distance from the mouth. 1 preocular in contact with the posterior nasal 2 postoculars temporals 1+1 7 supra labial 3rd and 4th touching the eye 5th and 6th touching the anterior temporal two pairs of subequal genals 3 or 4 infra labials touching the anterior pair. Scales in 13 rows. Anal divided. V ♂ 180-212 ♀ 203-244 C ♂ 28-36 ♀ 25-33 paired or rarely some of them unpaired.

Hemipenis extending to the 6th 8th caudal plate forked near the tip spinose and calyculate throughout the spines are short set on the margins of the calyces and of almost equal size except near the tip where they are smaller.



Fig 135 — *Callophis maclellandi*

There are many colour forms but the connections between them are easily recognized —

I Red or brownish above with regular narrow black transverse bars which may or may not reach the belly a series of small black spots on each side of the back between the bars may be present head black above except for a broad white transverse bar behind the eyes tip of the snout often light in colour yellowish below with black cross-bars or quadrangular spots. The common form Darjeeling Assam Burma north of the Abor country and south to the Pegu Yomas Tong King Annam S China Hainan Formosa Common in the hills of Assam.

II Similar to I but with a black vertebral stripe and the transverse bars restricted to the sides of the body or absent altogether (*univirgatus*). E Himalayas as far west as Katmandu.

III Similar to I but with the black cross bars reduced to transverse vertebral spots and a series of larger spots along the middle of the belly (*gorei*). Assam Upper Burma.

IV. Uniformly coloured above and below, except for a black ventral stripe and three rings on the tail (*nigri-venter*). Kasauli; known from the type-specimen only.

V. Purplish-brown above, uniform or with 3 longitudinal series of small indistinct black spots; belly with large black subquadrangular spots (*concolor*). Two specimens are known.

Total length: ♂ 635, tail 70; ♀ 780, tail 60 mm. Wall gives a total length of 812 mm.

The range of the ventral count given here, 182-244, is found in two specimens in the British Museum from Assam and Darjeeling respectively. There seems no reason, therefore, to regard the Formosan form, based on a high ventral count, as distinct.

Wall (1918) has given a good account of this snake, and his colour-plate, of what is one of the most beautiful of all the Indian snakes, is excellent. Maclelland's Coral Snake is found only in the hills, generally at between 3,000 and 6,000 feet altitude, and in country that is well forested. In disposition it is quiet and inoffensive. It feeds chiefly on snakes. A gravid female examined by him at Shillong, in August, contained 6 eggs, the embryos partially developed; another specimen (1926), killed on July 8th at Maymyo, contained 14 eggs.

325. *Callophis bibroni*.

Elaps bibroni Jan, 1858, Rev. & Mag. Zool. x, p. 526, Prodr. pl. B, 1859 (India; Paris), and Icon. Gen. xliii, 1873, pl. ii, fig. 1.—

Callophis bibronii, Boulenger, F.B.I. 1890, p. 386, and Cat. Sn. Brit. Mus. iii, 1896, p. 399; Wall, J. Bombay N. H. S. xxvi, 1919, p. 577, and Pois. Sn. Ind. 1928, p. 30, fig.

Elaps cerasinus Beddome, 1864, P. Z. S. p. 179 (Manantoddy, Malabar).—*Callophis cerasinus*, Beddome, Madras Quart. J. Med. Sc. xi, 1867, p. 15, pl. ii, fig. 5, and J. Soc. Bib. Nat. Hist. i, 1940, p. 316 (reprint).

One minute tooth behind the poison fangs. Eye very small, its diameter about twice its distance from the mouth; no preocular, the prefrontal touching the eye; 1 postocular; a single very long temporal; 7 supralabials, 3rd and 4th touching the eye, 5th, 6th and 7th touching the temporal; 1st infralabial much elongated, forming a long suture with its fellow; anterior pair of genials small, much shorter than the posterior pair, in contact with the 3rd and 4th infralabials; 4th infralabial much larger than the others. Scales in 13 rows. V. 219-227; C. 25-38.

Hemipenis extending to the 7th caudal plate, spinose throughout; the spines are smaller at the tip and gradually increase in size as they reach the proximal end of the organ.

Cherry-red to dark purplish-brown above, with black cross-bars; belly red, with large black spots which may unite with

the dorsal bars and form complete bands round the body head above black in front red behind

Total length ♀ 660 to 750 mm Wall records one 775 mm. in length

Range The Western Chata as far north as Coorg

32c *Callophis kelloggi*.

Callophis naccelland (not of Reinhardt) Boulenger 1899 P Z. S. p 166 (Huatan, Fukien China)

Hemibungarus kelloggi Pope 1908 Amer Mus. Nov no 320 p 6 (Chungan Hsien Fukien Prov., S China New York) and Rept. China 1935 p 344 fig head

Callophis wongi Fan, 1931 Bull. Dept B of Coll. Sci. Sun Yat-Sen Univ 11 p 178 fig (Hoh-nang Kwangsi Prov.)

Callophis wongi tonkinensis Bourret 1935, Bull. Gen. Instr. Pub. Hanoi, April, p 46 (Tam-dao Tong King Paris not seen by me) and Serp. Indochine 1936, p 411 fig head.

Like *n. d. llandi* in general scalation differing as follows — Diameter of the eye equal to its distance from the mouth temporals 1+ Scales in 15 rows V 184 C 31

Peddish brown above with 17+8 narrow black cross-bars faintly edged with white pale orange below with large squarish or angular black spots mesially placed but not reaching the borders of the ventrals they correspond in position with the dorsal bars head black above with a light crescentic mark across the snout in front of the eyes and a A-shaped one on the back of the head its apex on the frontal the arms extending to behind the mouth

Pope has placed *wongi* under *kelloggi*. The description of *tonkinensis* differs slightly in colour pattern from that given for *kelloggi* but agrees entirely with the individual recorded by Boulenger under *naccelland* from Fukien and which Pope has placed and rightly under *kelloggi*. The scale counts are from the Tong King specimens They differ from the Chinese which are given by Pope as V 191 00 C 29-33

Genus NAJA

CORRAS

Naja Laurent 1 68 Syn Rept p 91 (type *Coluber naja* Linn.)

Tricus Wagler 183 Nat Syst Amphib p 173 (type *Coluber naja* Linn.)

Aspis Wagler 1 c s p 173 (non *Laurenti*, 1 68) (type *Naja naja*)

Tommys Eschwald, 1831 Zool Spec. III, p 171 (type *arsiana*).

Hamadryas (non Hubner 1806) Can. or 1836 Anat. Rec. XX, p 37 (type *lowndsi*)

Dendroaspis F. ainger 1843 Syst. Rept p 43 (type *bungarus*)

Pseudonaja Gunther 1858, Cat. Col. Serp. Brit. Mus. p. 222 (type *nigra*)

Ophiophagus Gunther 1864 Rept. Brit. Ind. p 341 (type *slaps*)

Maxillary bone extending forwards beyond the palatine

poison fangs followed by from 1-3 small teeth. Head not very distinct from neck, dilatable in the Asiatic species, the anterior ribs being elongate. Eye moderate, pupil round. Nostril between an anterior and a posterior nasal; head shields normal, except the loreal, which is absent. Scales smooth, disposed obliquely, in from 13-25 rows on the body; subcaudals usually paired.

Range. Southern Asia and Malaysia; Africa.

Some 12 species are known; two inhabit the Oriental Region.

Key to the Species.

- Scales in 19-25 rows; no occipital shields *naja*, p. 427.
Scales in 15 rows; a pair of large occipital shields *hannah*, p. 436.

327. *Naja naja*.

INDIAN COBRA; COBRA.

Naja naja naja.

- Russell, Ind. Serp. i, 1796, pls. v and vi, and ii, 1801, pls. i and xxxvi.
Coluber naja, Linn. 1758, Syst. Nat. 10th ed. p. 221, based on Seba, Thes. i, 1734, pl. 44, figs. i and ii, pls. 85, fig. i, and 89, figs. 1-4, and 90, figs. 1-2, and 97, figs. 1-4 (habitat in India); Andersson, Kungl. Sv. Vet.-Akad. Handl. xxiv, 1899, 4, p. 17.—*Naja naja*, Prater, J. Bombay N. H. S. xxx, 1924, p. 175; Wall, ibid. 1925, pp. 242 and 820, and xxxi, 1926, p. 565, and Pois. Sn. Ind. 1928, p. 23; Anon., J. Bombay N. H. S. xxx, 1925, p. 705; Leigh, ibid. xxxi, 1926, p. 227; Tscherbakoff, ibid. xxxviii, 1935, p. 321; Bourret, Serp. Indochine, 1936, p. 394; Smith, J. Nat. Hist. Soc. Siam, xi, 1937, p. 62; Barker, J. Darjeeling N. H. S. xi, 1936, p. 81; Inglis, ibid. 1937, p. 118.
Naja lutrescens Laurenti, 1768, Syn. Rept. p. 91 (India; based on Seba, i, pl. 44, fig. 1).
Naja fasciata Laurenti, l. c. s. p. 91 (India; based on Seba, ii, pl. 89, fig. 3).
Naja siamensis Laurenti, l. c. s. p. 91 (Siam; based on Seba, ii, pl. 89, figs. 1-2).
Naja maculata Laurenti, l. c. s. p. 91 (India; based on Seba, ii, pl. 90, fig. 2).
Coluber cæcus Gmelin, 1788, Syst. Nat. i, p. 1104 (India; based on Seba, ii, pl. 90, fig. 1).
Coluber rufus Gmelin, l. c. s. p. 1105 ("Brazil"; based on Seba, ii, pl. 89, fig. 4).
Naja tripudians Merrem, 1820, Tent. Syst. Amphib. p. 144 (subst. name for *C. naja* Linn.); Günther, Rept. Brit. Ind. 1864, p. 338; Fayrer, Thanatoph. Ind. 1874, pls. i to vi; Boulenger, F. B. I. 1890, p. 391, fig., and Cat. Sn. Brit. Mus. iii, 1896, p. 380, and Rept. Malay Pen. 1912, p. 201; Brook-Fox, J. Bombay N. H. S. xvi, 1905, p. 369; Bannerman, ibid. xvi, 1905, pp. 363, 638, and ibid. xvii, 1907, p. 1031; Bannerman & Pocha, ibid. xxi, 1912, p. 1337; Wall, ibid. xviii, 1908, p. 126, and xix, 1909, p. 355, and xxii, 1913, p. 243, col. pl. and p. 550, and xxvi, 1919, p. 575, and xxviii, 1922, p. 553, pls. hood patterns, and Sn. Ceylon, 1921, p. 459; Barnard, Spol. Zeyl. vi, 1910, p. 174; Bobeau, ibid. 1913, p. 16; Smith, J. Nat. Hist. Soc. Siam, i, 1914, p. 179, photos: Acton & Knowles, Ind. J. Med. Res.

- 1914, p. 46, Lovett-Yeats, J Bombay N. H. S. xxiv, 1916, p. 371, O'Brien, *ibid.* xxx, 1923, p. 303, Chatterjee, *ibid.* xxxiv, 1931, p. 1085, and xxxv, 1932, p. 273; Miller & Pagden, *Nature* 1931, p. 706, Jennison P. Z. S. 1931, p. 1413; Fraser, J. Bombay N. H. S. xxxix, 1937, p. 443.
Naja naja col var *polycellata* Deraniyagala, 1939, Ceylon J. Sci. B. xi, p. 233, photo (Polonnaruwa, N. Central Prov., Ceylon; London).

Naja naja kaouthia

- Naja kaouthia* Lesson in Ferrussac, 1831, Bull. Sci. Nat. xiv, p. 122, and in Blanford Voy. Ind. Orient. Rept. Sept. 1832, p. 312, pl. 2 (Bengal) — *Naja naja kaouthia*, Smith, Rec. Ind. Mus. xli, 1940, p. 463.
Naja tripudians var *fasciata* (not of Laurenti) Hardw. & Gray 1834 Ill. Ind. Zool. ii, p. 78 (Dum-dum, Bengal; Hardwicke's sketch no. 175).
Naja larvata Cantor 1839 P. Z. S. p. 32 (Calcutta, Assam; coloured sketch in Bodleian Library, no. 14).
Naja atra Cantor, 1842, Ann. Mag. Nat. Hist. ix, p. 482 (Chusan Island) — *Naja naja atra*, Stejneger, Bull. U. S. Nat. Mus. no. 58, 1907 p. 394, Pope Rept. China 1935, p. 348, pl. xvi, figs. 4 d and e.
Naja tripudians var *scopinucha* Cope, 1859, Proc. Acad. Nat. Sci. Philad. p. 343 (Canton River).
Naja tripudians, Stoliczka, J. A. S. Bengal, 1870 p. 212, Flower, P. Z. S. 1899, p. 690, Wall, J. Bombay N. H. S. xviii, 1908, p. 330, and *ibid.* xix, 1910, p. 840.
Naja tripudians var *unicolor* Martens, 1876, Preuss. Exp. Oct. As. Zool. i, p. 382 (China and Sumatra).
Naja tripudians var *candida* Wall, 1913, J. Bombay N. H. S. xxii, p. 247 (Surma).
Naja tripudians var *sagittifera* Wall, 1913, J. Bombay N. H. S. xxii, p. 248 (Andaman Islands).

Naja naja oriana

- Tommys oriana* Fischwald, 1831, Zool. Spec. lu, p. 171 (Transcaucasia), and Faun. Cauc. Cauc., 1841, p. 104 pl. xx — *Naja oriana* Boulenger Tr. Zool. Soc. (2) v, 1889 p. 103, pl. xi, fig. 2.
Naja tripudians, Stoliczka, J. A. S. Bengal, xxxix, 1870, p. 211, Wall, J. Bombay N. H. S. xix, 1910, p. 1001, fig., and xx, 1911, p. 1042 and xxi, 1913, p. 141.
Naja naja, Nikol'sky, Faune de la Russie 1916 p. 204.

Under the typical form are listed a large number of references that deal with the species in general and not with any particular race.

Poison fangs followed by a small tooth, sometimes absent. Eye moderate, its diameter equal to or a little less than its distance from the mouth, nostril large, vertically elliptic; frontal usually longer than broad, with truncate anterior margin, internasals as long as or a little shorter than the prefrontals, 1 preocular, usually in contact with the internasal, 3, rarely 2, postoculars, 7 supralabials, 3rd highest, 3rd and 4th touching the eye, temporals 2+3, 4th and 5th infralabials largest, usually with a small triangular scale*.

* The cuneate scale of Wall.

between them on the oral margin; two pairs of genials, the anterior a little larger than the posterior, in contact with 4 infralabials; posterior pair partly or completely separated by a scale. Scales smooth, oblique, the outer 2 or 3 rows larger than the others.

Hemipenis extending to the 10th caudal plate, forked opposite the 7th; it is divided into three areas, which are fairly abruptly defined from one another, namely a proximal one beset with minute spines, a median one with very much larger spines, and a distal calyculate area, the cups being poorly developed and having spinose edges. The median area is further interrupted by a narrow, transverse, smooth area, which does not, however, intercept the sulcus or its two adjacent longitudinal ridges.

Total length: 1350 to 1500, tail about 230 mm. Many larger specimens have been recorded, but they are rare. Wall

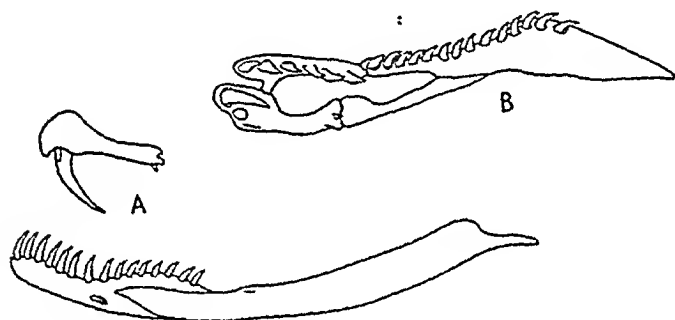


Fig. 136.—*Naja naja*.

A. Maxilla and mandible. B. Palato-maxillary arch.

(1913, p. 248) mentions one from Ceylon which was 7 feet in length. It appears to be the record. There is no marked difference in size between the sexes.

Several attempts have been made to define races for the Indian Cobra, none with entire success. Boulenger's varieties (Cat. iii, p. 381) ignore geographical distribution. Wall, utilizing scale-counts, has divided the asiatic mainland form into five races (Handlist Sn. Ind. Emp., 1925), and my own counts, based largely on the same material, agree closely with his. They are summed up in the table. It will be seen that the highest body-count occurs in Ceylon, and that there is a gradual reduction in the number of scale-rows as the species extends north in the Peninsula of India. From northern India, through Indo-China to China, the difference is slight. The overlap between the areas is considerable. The greatest

reduction in scale rows takes place in the Malayan region, the Bornean form having only 15 at mid body

The enormous amount of variation, both in coloration and in colour pattern which is found in Cobras, even in individuals from the same district is well known the variation from youth to age is also considerable the tendency being for the markings to become obliterated as age progresses. Individuals which have light or dark bands cross bars variegations or reticulations upon the body are fairly common and do not appear to be restricted to any particular area. They are more common in India than in Indo-China. Any attempt to define races on general coloration is hopeless. The pattern upon the hood, however is with certain reservations, constant definite types can be distinguished and they can be correlated with geographical distribution. Many departures from the typical

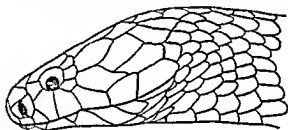


Fig 137 — *Voaja naja*

picture through disintegration of the pattern will be found but the stages which have led up to them can be traced, many individuals also even juveniles, have no markings at all. A racial arrangement of the species based on hood pattern seems therefore to offer a better solution than one based on scale counts for it is in accordance with natural faunal areas.

Three types of hood pattern can be defined namely, the well known 'spectacled' or binocellate form inhabiting the whole of the Peninsula of India (*forma typica*) an O-shaped or monocellate form ranging from Western Bengal across Indo-China into China (*laoukha*), and a barred form found in the extreme north west of India and extending into Transcaspia (*arvina*).

In the following descriptions only the coloration of the young is given for only in them can any constancy be found.